UNIVERSITY OF PENNSYLVANIA

A DESCRIPTIVE AND PREDICTIVE STUDY OF A CLASS IN A SCHOOL OF EDUCATION

IRVIN TABOR SHULTZ

A THESIS

IN EDUCATION

PRESENTED TO THE FACULTY OF THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

PHILADELPHIA
1928

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TO MY MOTHER

INTRODUCTION

STATEMENT OF PROBLEM AND PURPOSE OF THE STUDY

Among the unsolved problems in education listed by Koos[1] in his chapter on The High School Staff is one which is concerned with the choice, selection and training of the types of people who are to be admitted into our institutions for the training of secondary school teachers. The training institutions referred to by Koos are not normal schools, but teachers' colleges, schools of education, or departments of education in our liberal arts colleges and universities. The normal schools, whatever their ambitions may be, are still essentially teacher-training institutions for the elementary schools. A few are called teachers' colleges, particularly where they include elementary and secondary teacher-training courses, but in the main the normal schools are concerned with training teachers for elementary service. The liberal arts colleges with their related departments of education, and the universities with their schools of education, are the primary means for training high school graduates for professional service in the secondary schools.

Schools of education and departments of education are of relatively recent growth, due to the increasing demand for professionally trained teachers, a demand which was expressed by the people through the new and amended school codes that have been adopted by state after state during the last two decades. The result of this recent and relatively rapid growth of schools of education and departments of education has brought forth numerous problems which need scientific study. These problems are similar to those which the normal schools and teachers' colleges have been, and are, attempting to solve. They are also different because of different aims, personnel

[1]Koos, L. V.: The American Secondary School, 687. Ginn and Company, 1927.

and conditions that are inherent in this type of educational service.

During the last few years both descriptive and predictive surveys have been made in the normal school field dealing with such problems as social and economic backgrounds of students, student personnel in training for teaching courses of study, and follow-up problems of actual experience in the field.

One of the earliest descriptive studies was made by Meriam in 1905.[1] He was one of the first to show by correlation the relationship of normal school education to efficiency in teaching. He found a correlation of +.443 between practice teaching and actual teaching. He also correlated teacher efficiency and scholarship. His correlations are very close to the correlations found in later studies.

Knight's study[2] was concerned with the measurement of certain qualities present in the teacher in service. It is concerned, as he suggests, with the problem of isolating the significant and measurable qualities of effective teaching and measuring these qualities. It is post-diagnostic and not prognostic; he does not predict. Teachers rate each other on particular traits. The problem of guidance in the normal school was his concern.

Sommers[3] made a very intensive and thorough study and follow-up of 150 normal school students at the State Normal School for Women at Farmville, Virginia. His study is both diagnostic and prognostic. He used marks, personality traits, intelligence tests and other factors as a basis for prediction; his method is that of partial correlation and the regression equation. Actual teaching success, according to Sommers, is predicted best by tests and personality ratings.

By far the most recent and comprehensive study of the diagnostic and predictive or prognostic type is that made by

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[1]Meriam, J. L.: Normal School Education and Efficiency in Teaching. (Contributions to Education, No. 1, Teachers' College, Columbia University, 1906.)

[2]Knight, F. B.: Qualities Related to Success in Teaching. (Contributions to Education, No. 120, Teachers' College, Columbia University, 1922.)

[3]Sommers, G. T.: Pedagogical Prognosis. (Contributions to Education, No. 140, Teachers' College, Columbia University, 1923.)

Whitney.[1] He measured the traits of 1156 graduates from two-year college curricula in 12 representative normal schools, geographically well scattered. The traits selected were:

1. Teaching success as judged by supervisory officers during the first semester under contract after graduation.
2. Intelligence as measured by the Army Alpha and Thorndike's examination for high school graduates.
3. Secondary record, an average of all high school marks earned during a four-year course.
4. Academic record, an average of all marks earned in normal school subject matter courses.
5. Professional record, an average of all marks in normal school courses in education.
6. Student teaching, an average of all the marks made in practice teaching.
7. Health record of each student.

All of these factors are combined and related through correlation, both partial and multiple, to the criterion Teaching Success after Graduation. The regression equation is used to predict Teaching Success.

When by this method the factors are arranged in rank order of importance to the criterion, Actual Teaching Success, they are:

1. Student teaching.
2. Professional marks.
3. Academic marks.
4. Physique.
5. Secondary record.
6. Intelligence.

Three measures, according to Whitney, can be readily obtained at matriculation from students seeking entrance to the normal school: (1) Intelligence, (2) Secondary Record, and (3) Physique. These, he states, may be most conveniently used to predict teaching success.

[1]Whitney, F. L.: The Prediction of Teaching Success. Public School Publishing Company, 1924.

Many colleges, also, through their personnel departments and offices of admissions, are using combinations of tests, secondary records and examinations for admitting students. Studies[1] are being made to predict, on the basis of certain factors at entrance, the probable length of time that a student will stay in an institution. These studies are being used as a basis for guidance. This study is not concerned with the problems of the college and the normal school. Its scope is limited to an intensive study of a particular group in a school of education. The study attempts to make a contribution in the field of teacher training for secondary schools, a contribution peculiar to the guidance problem in the School of Education of the University of Pennsylvania.

The study approaches the problem of guidance from two viewpoints: first, that of the officials of administration, and second, that of the students.

From this first view-point, it attempts to answer the following questions:

1. From what secondary schools do students come?

2. How do these entering students compare with other groups in similar institutions as measured by intelligence tests?

3. How many discontinue their work in the School of Education and why?

4. How well does the criterion, Marks in Practice Teaching, compare with judgments of supervisory officials who

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[1]Recent personnel studies of college groups:

Alderman, G. H.: Failure Among University Freshmen, University of Pittsburgh, Pittsburgh, Pa., 1926.

Brotemarkle, Robert A.: College Student Personnel Problems, Journal of Applied Psychology, VI and XII, December 1927 and February 1928.

Brotemarkle, Robert A.: Mental Graph Types at the College Adult Level, University of Pennsylvania, Philadelphia, Pa., 1926.

Creamer, W. J.: Personnel Work with Freshmen at the University of Maine, Orono, Maine, 1926.

Edgerton, Harold A.: Predicting Academic Mortality, Ohio State University, Columbus, Ohio, 1926.

Kornhauser, A. W.: A Study of Four Reference Forms used for Obtaining Reports of Students Entering College, 1926.

Wood, E. R.: Educational Adjustment of College Freshmen. Kansas State Teachers' College, Emporia, Kansas, 1926.

have rated graduates with one or two years' actual experience in teaching?

5. What was the selective power of subject matter; did subject matter tend to select students of varying capacities?

6. What predictions can be made from factors at entrance in terms of the criteria: (1) Persistence in School, (2) Practice Teaching Marks, (3) Scholarship?

7. Which factors are the most significant for description and prediction?

Wherever it was necessary to show relationships and make predictions, the method, correlations of the order zero, partial and multiple, and the regression equation, which have been used in similar studies already referred to, were used. here.

The factors considered at entrance of candidates to the School of Education from which a prediction was attempted are:

1. Entrance units of Latin.
2. Quartile rank in a Secondary School.
3. Army Alpha Scores.
4. Terman Group Test Scores.

The factors considered as criteria for judging the entrance factors qualitatively and quantitatively are:

1. Persistence in School of Education (Quantitatively).
2. Practice Teaching Marks (Qualitatively).
3. Scholarship by marks (Qualitatively).

The second part of the study attempts to gain from the viewpoint of students by means of a questionnaire an answer to the following questions for guidance purposes:

1. To what extent are the graduates teaching what they were prepared to teach?

2. To what extent are graduates responsible for extra-curricular activities in the high schools where they are teaching, and what preparation have they received for this?

3. What types of work other than teaching do graduates of the School of Education enter into?

4. What is the nature of the preparation they receive for this work in the School of Education?

The extent to which this study reveals facts and tendencies for guidance in the School of Education, or facilitates further study in this field to teacher training, based on a larger number of cases, to that extent has it made a contribution.

CHAPTER II

ANALYSIS OF DATA

In this study, a single class was chosen, rather than any particular group selected on any other basis. The idea was to study a class in its progress through the School of Education from as many angles as possible. The class that graduated in June 1927 was chosen because the Army Alpha Form 9, and Terman Group Test A had been given them in their freshman year, 1923-24. Also, the fact that the class has been out of school for only one year gives the added advantage of collecting data before the group had lost contact.

The class graduating in June 1927 also represents a period in the evolution of entrance requirements and the application of guidance technique. The period following the war allowed a more unselected group to enter with less supervision on the part of the faculty of the School of Education than there is at present. The practice that has arisen in the last three years of collecting information and preserving records of the student on the part of both secondary schools and colleges, the installation of personnel officers both in the College and School of Education, and the improved technique of testing that is used by the Psychological Department, will add materially to the knowledge of facts for admittance and guidance of students for future study.

Access was gained to the files in the Admissions Office, and to the records of this class in the office of the School of Education. Care was taken to include in this study only students who had graduated from secondary schools or had transferred from other colleges. All students who had either teaching experience or had attended normal school were excluded.

One hundred and fifty-five cases were made available for study. Later, two of these had to be dropped because of insufficient data, so that 153 cases, which was practically all of

the entering class of 1923-24 that had not had either normal school or teaching experience or both were chosen.[1, 2]

The class included both September and February entries into the School of Education. The Terman Group Test, Form A, and the Army Alpha, Form 9, were given in January and

[1]Of the class studied:
256 students entered September, 1923.
155 students graduated.
69 students withdrew.
32 students excluded.
Of the 155 students who graduated:
98 entered from High Schools.
18 entered from Normal Schools.
39 entered with Advanced Credits.
Of the 101 students who did not graduate:
48 entered from High Schools.
23 entered from Normal Schools.
30 entered with Advanced Credits.
Of the 256 students who entered September, 1923:
146 entered from High Schools.
41 entered from Normal Schools.
69 entered with Advanced Credits.
Of the class studied:
74 students entered February, 1924.
38 students graduated.
33 students withdrew.
3 students excluded.
Of the 38 students who graduated:
21 entered from High Schools.
8 entered from Normal Schools.
9 entered with Advanced Credits.
Of the 36 students who did not graduate:
11 entered from High Schools.
11 entered from Normal Schools.
14 entered with Advanced Credits.
Of the 74 students who entered February, 1924.
32 entered from High Schools.
19 entered from Normal Schools.
23 entered with Advanced Credits.
146 Students entered directly from High Schools in Sept.
32 Students entered directly from High Schools in Feb.

178 Students entered directly from High Schools.
155 Students for whom data was available.

23 Students without data.

A total of 330 students entered of whom a total of 130 dropped out, which is approximately one-third of the class studied.

[2]In order to find out how this class ranked in proportion to other classes as to the relative percent graduating and not graduating, the following

April of the college year 1923-24 to the entering students.[1] Great care was exercised in following directions as to time and instructions. The tests were scored and rechecked for accuracy. With one or two exceptions, the students reported they had not taken any intelligence tests before.

Two of the factors studied, Entrance Units of Latin, and Quartile Rank in secondary school, were taken from records in the Office of the Director of Admissions. In checking over the entrance units, it was found that every student offered about the same number of units of English, Social Sciences, including history and government, mathematics, Spanish, French or German. In Latin, however, there was considerable variation, a large percent offering no Latin, and quite a number more offering 4 units of Latin. Seventy-six, or approximately 50%, offered 4 units, while 30% offered no units of Latin; the remainder, or 20%, offering 3 units and 2 units. The fact that 153 students offered such varying amounts of Latin, with small variation in other subjects, leads one to ask the question: Do students who offer large amounts of Latin for entrance make better students on the whole than those who

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facts from two other classes were tabulated from the cards in the Dean's office of the School of Education:

In the class of 1921:
255 students entered in September of 1921.
77 either withdrew or were excluded.
42 students entered in February, 1922.
16 were either excluded or dropped out.

This left a total of 297 entering and 204 graduating, and 93 or 31 percent, dropping out, or approximately one-third of the class.

In the class of 1922:
288 students entered in September 1922.
76 either withdrew or were excluded.
44 students entered in February 1923.
18 withdrew or dropped out.

This left a total of 272 students entering, 178 graduating, and 94, or 34 percent dropping out, or again roughly one-third. In the class studied, a little less than one-third dropped out. The above two classes compare fairly well with this class. One can say that at least for a period of time roughly one-third drop out and two-thirds remain to graduate. The class studied is, therefore, a normal class for this period from this point of view.

[1]The tests were given under the direction of Dr. E. D. Grizzell, Assistant Professor of Secondary Education.

do not? Is there any selective value in Latin? Of course it is not known why the students took Latin. They may have been persuaded to do so by their teachers, or they may have chosen the subject of their own free will. Perhaps several forces worked together to cause these students to take Latin in their secondary school courses. To find out if units of Latin have any selective value, Latin units for entrance were used as one of the factors. Other subjects offered for entrance would have been studied in the same way if they had been offered in sufficiently varying amounts.

The Quartile Ranks of these students in secondary schools were tabulated from the admission records. The validity of the quartiles will be dependent upon how carefully the student was rated by the supervising officer of the school. It can be assumed that in the main this was carefully done, since admittance to the University without an examination at that time was conditioned on the candidate's rank in his class and the standing of the secondary school thus determined. This rank was based on scholarship alone; personality factors were supposed not to enter in, though of course they could not be altogether excluded where the human factor is concerned.

The quartile rank of a student is a more reliable index of the scholarship of a student than are secondary school marks, since the quartile rank is based on averages over a period of time. However, schools vary in standards, size of classes, and abilities of students. These variations are sources of error, and cannot be measured. The importance that the quartile rank tends to play in description and prediction later on would suggest that the above errors are small in the class under investigation. Perhaps this is because two-thirds of the group graduated from Philadelphia High Schools where the ranking was more uniform.

The blank which contained the quartile rank also listed several personality items. These were not deemed sufficiently reliable for use in this study, as only part of the items were checked, and this was not consistently or carefully done.

An effort was made to get a personality rating of these students. Three schools were visited, one in Philadelphia and two outside, in an effort to find written records of students that would be reliable enough for use. These schools in 1923-24 kept no records of personality factors. The principals of the smaller schools could have rated students from memory, perhaps, with a fair degree of reliability, but in the large high schools, personal ratings from memory were considered too unreliable to use. That there is a need for personnel checking in personality traits is realized. High schools[1] are now rapidly extending their systems of records and reports to include these items, but for this particular class there were none.

The two items, or factors, entrance units in Latin and Quartile Rank in secondary school were secured at graduation from high school. The Army Alpha scores and Terman Group Test scores were secured in the first year of entrance to the School of Education. The other factors, Scholarship, Practice Teaching and Persistence in School, were taken from the records of the students which were on file in the Dean's office in the School of Education.

Scholarship is here defined as the average number of "D's", "C's", "P's" and "F's" that a student earned in his stay in the School of Education. In the grading scheme used, "D" stands for Distinguished, "G" for Good, "P" for Passing, and "F" for Failure. The "N" or condition was not used, as eventually an "N" becomes either a "P" or an "F". There is no way of validating these marks exactly.

Almost every writer on educational statistics has something to say with reference to the marking system. Rugg, Kelly and others[2] generally recommend the use of the normal probability curve in assigning marks to pupils on the assumption that any unselected group tends to fall in equal propor-

[1]Upper Darby, and Cheltenham Township High Schools have established Personnel Records for later classes.

[2]Rugg, Harold O.: Teacher's Marks and the Marking System, Educational Administration and Supervision, I; 117. February 1915.
Kelly, T. L.: Teachers' Marks. (Contribution to Education, No. 66, Teachers' College, Columbia University, 1914.)

tions on each side of a central tendency, such as mean or median. Whether one can assume the fact that students in the upper grades, high school and college approximate the normal curve is questionable. Of course educational writers do not recommend the absolute use of the normal probability curve, but they think that the consciousness and knowledge of chance grouping should be in the background of the teacher's mind so as to prevent the assigning of too large a percent of high marks on the one hand, or of low marks on the other.

Again, how is one to equalize marks given in one department, say Physics, as against, say English? Does "D" in Physics demand more or less work and ability than a "D" in English? Is a "D" in a lecture course in Psychology equivalent to the same "D" given in a laboratory course? Everyone will admit that some "D's" are easier to earn than others, and that a "P" is as hard to earn in one course as a "G" in others. These are errors that have to be considered, but in an average grade spread over four years there is a tendency for the variations to neutralize each other.

Miller, in a psychological study of college men,[1] arbitrarily assigned the following weights: D = 5, C = 4, P = 3, N or F = 1. He multiplied the number of D's, G's, P's that a student earned by each of these weights and averaged them, thus giving an average scholarship grade to each student.

This is the method adopted in this study, except that D = 4, G = 3, P = 2, N = 1 and F = 0, the credits of D's, G's, P's, N's and F's being multiplied by their respective weights, added together and divided by the total number of credits. The average or raw score ranged from 0 to 3.86.

The Practice Teaching mark is an average of the subjective judgment of three persons besides the critic teacher under whom the practice teaching was done. Besides other requirements, the student must take 12 units of Education and 6 units of Psychology. One unit of Education is taken in practice teaching and observation, which includes one semester

[1]Miller, Karl G.: The Competency of Fifty College Students, 34. University of Pennsylvania, 1922.

of each in the schools in and around Philadelphia. This is taken in the student's senior year. The teacher under whom the student teaches ranks the student according to the following scheme, based on the teacher's observation of the student.

CREDIT FOR EXPERIENCE

	Rating				
Student	*Qualities*	*F*	*N*	*P*	*G*	*D*
School	Appearance					
Location	Voice					
How Reached	Attitude					
Subject	Grasp of Sub.					
Taught.....years in H. S.	Room					
.....yrs. in E. S.	Disc'p.					
	Pupils' Responses					
	Gen. Rating					
Credit desired:	Remarks					
.....units in Ed. 51	Grant.....units in Ed. 51					
.....units in Ed. 52	Grant.....units in Ed. 52					

This mark of the teacher is averaged with a mark given the student by the Dean of the School of Education, and two Assistants who are in close contact with the work of the student both in classroom work, extra-curricular activities, and practice teaching. The mark given by the Dean and two Assistants is a subjective rating based on all-round judgment as to the teaching personality of the student. The viewpoint of a superintendent who is looking for a prospective teacher is taken. Assuming that the student in question is a candidate, all the facts are gathered and a mark given. These three subjective ratings with the additional mark of the critic teacher, who has had the student in charge, are averaged and a final mark in practice teaching is the result. How is the practice teaching mark earned in the School of Education? How nearly does it correlate or approximate the judgment of superintendents and supervisors who employ these teachers? In order to find out the reliability of the practice teaching mark in terms of actual teaching in the field, a questionnaire was

sent to 175 graduates from the classes that graduated in 1923 and 1924. The only basis for selection was that the students in those two classes had entered the School of Education without previous teaching or practice teaching experience. The 1923 and 1924 classes were chosen because each student that graduated then would have had at least one year to polish off the rough edges and orient herself in her work, so that the second or third year a truer measure of worth might be secured. It may well be possible that a potentially excellent teacher, due to various reasons, might not be a success the first year, but by the second year results should appear. Table I shows the relationship of Practice Teaching marks and superintendents' ratings for fifty-eight students, and the Practice Teaching marks of thirty-five students who are not teaching.[1]

Data could be secured from only 93 cases out of the 175. Of these 93 cases, 58 were teaching and 35 not teaching. A letter was sent to school supervisors of those who were teaching[2] asking them to rate the teacher in question on a 7-point scale, letting "D" stand for the best teacher in his system and "P" the poorest. Inspection of Table I shows the scatter diagram and distribution of the marks of practice teaching in the School of Education and the ratings by school supervisors.

Also, to the right is shown the distribution of 35 graduates who are not teaching. Analysis of Table I shows from somewhat limited data, that the relationship between the practice teaching marks given in the School of Education and the ratings of the superintendents is low. The correlation is actually .12, which means there is practically no correlation between practice teaching marks and superintendents' ratings. The student getting a low mark in practice teaching is almost as likely to get a good mark in actual teaching in the field as a student getting a high mark in practice teaching. The distribution shown at the bottom of the graph, i.e. the superintendents' ratings compare favorably with the distribution

[1]See page 24.
[2]See Appendix for rating scale.

TABLE 1

SHOWING THE RELATIONSHIP OF PRACTICE TEACHING MARKS AND SUPERINTENDENTS' RATINGS

		SUPERINTENDENTS' RATINGS									
		NOW TEACHING								Total Now Teaching	Not Teaching
		P—	P	P+	G—	G	G+	D—	D		
	D			1	1	3	1			6	5
Practice	D—				1	4	6	4		15	8
	G+		1	1	3	3	4	2		14	6
Teaching	G				1	4	5	2		12	7
	G—	1		1		4	1	1		8	6
Marks	P+				1					1	3
	P					2				2	
	P—										
		1	1	3	7	20	17	9		58	35

r. = .12 between Practice Teaching and Superintendents' or Supervisors' ratings.

93 Cases of the class graduating in 1923-24.

58 Teaching.

35 Not Teaching.

to the right, i.e. practice teaching. The distribution of thirty-five cases who did not teach compare favorably with the distribution of those who secured positions; both are fairly symmetrical though the number of cases is small. It would seem from this comparison that those who did not get positions were just as qualified to teach as far as the practice teaching mark is concerned as those that did. That is, the mark given in practice teaching seems to bear little relationship to the fact that the thirty-five students are not teaching. Some other causes besides marks kept these students out of the profession.

There is a tendency in judging teaching to try objective measurements instead of a purely subjective rating. Recent studies advocate measuring the results of teaching, instead of the teacher.[1]

Whitney suggests that the best measure of the efficiency of a teacher yet conceived is the progress of the pupils, and recommends the use of standardized intelligence tests to measure ability and then on this basis measure the achievement of the pupil under a given teacher.

He recommends the use of such tools as the intelligence quotient,[2] the accomplishment quotient[3] and the educational quotient.[4]

The tendency seems to be in favor of more objective measurements rather than the traditional plan of visitation and subjective judgment; yet, until there are better objective measurements, the traditional methods must still prevail. There are no reliable yardsticks for measuring such important outcomes and values of teaching as attitudes, interests, ideals, loves, predispositions and the like, though the skills, habits

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[1]Sears, J. B.: Measurement of Teaching Efficiency, Journal of Educational Research, IV: 84, 1921.
Whitney: The Growth of Teachers in Service, 430. Century Co., 1927.
Brooks, Samuel: Measuring the Efficiency of Teachers by Standardized Tests, Journal of Educational Research, IV: 161, 1921.

[2]Dickson, V. E.: Mental Tests and the Class Room Teacher, World Book Company, 1922.

[3]Frazen, J.: The Accomplishment Quotient. Teachers College Record, November, 1920.

[4]Haggerty, M. E.: Rural School Survey of New York State, Educational Achievement. World Book Company, 1920.

and knowledges, etc., may be, and should be measured by every device possible and used as a part of the score of teaching ability. The more intangible outcomes must be as yet measured by a subjective rating scale, relying on the experience, observation and judgment of the supervisor. Expert opinion based on experience has its place in judging teaching. A study[1] in vocational guidance carried on in London definitely shows that the reliability of judgments by trained specialists is high.

The whole point to the above is that while the practice teaching mark is based on a subjective rating, it is not altogether unscientific, though the tendency is now to emphasize the measurable outcomes of teaching. Expert opinion and objective measurements are both necessary to arrive at a true measure of the worth of the teacher. Perhaps when measurements are more accurate and the School of Education can control and study conditions better in a Practice School, a better measuring device may be secured for measuring the results of teaching.

In addition to the factors of (1) Latin Units for Entrance, (2) Army Alpha scores, (3) Terman scores, (4) Quartile Ranking, (5) Practice Teaching marks, (6) Scholarship, and (7) Persistence in School, it was hoped that the results of psychological tests given to the class in the sophomore year could be used. This had to be abandoned, however, because a complete set of results for each student could not be found.

In order to find out why students dropped out of the School of Education, a questionnaire (see Appendix) was drawn up and sent out. The questionnaire was criticised by the seminar and by members of the group committee, and was then sent out from the Dean's office. As students were asked not to sign their names, presumably the replies were correct;

[1]Spielman, Winifred, and Burt, Cyril: A Study in Vocational Guidance. Medical Research Council, Report 53: 37. London, 1926. Carried out by the Industrial Fatigue Research Board and National Institute of Industrial Psychology.

at least their nature indicated that such was the case. The results appear later in the study.

In order to study the factors, Entrance Units of Latin, Army Alpha, Terman, Quartile Ranking, Practice Teaching and Scholarship, it was necessary to reduce them to some common denominator. For instance, a student is in the third quartile in his class in high school, his Army Alpha is 150, his Terman 130, and he offers no units of Latin. With these raw scores it is difficult to do any calculating either in correlations or estimating percentages. To get these scores to a common denominator, a distribution was made of each factor from the highest raw score to the lowest. Taking the procedure for the Army Alpha as an example, the raw scores for 155 cases ranged from 186 to 75. The standard deviation or sigma (known as the standard deviation from a central tendency, in this instance the mean,) was found by the formula:

$$\sigma = \sqrt{\frac{\Sigma D^2}{n} - \left(\frac{\Sigma D}{n}\right)^2} \text{ times the step interval,}$$

which in this case was five. This is a shorter method which corrects the error and saves work. The S. D. or Sigma was 24.3. The mean or average was found by the formula:

$$\text{Assumed mean} + \frac{\Sigma D}{n} \text{ times five, the step interval.}^1$$

This was found to be 141.5.

The Sigma score which was used throughout the study as a refined unit was found by the formula:

$$\sigma \text{ Score} = \frac{\text{Raw Score} - \text{Mean}}{\sigma}$$

Taking any raw score on the Army Alpha, say 150, and substituting in the above formula.

$$\frac{150 - 141}{24.30} = \frac{9}{24.30} = .37$$

Since decimals are hard to manage in calculations, and in

[1]See Garrett, H. E.: Statistics in Psychology and Education, 28, for description of formulas.

order to facilitate the process of correlation, this .37 was multiplied by three, giving 1.11. The fraction thrown away, the result, 1, was added to 10 algebraically, making 11, which is the same as the raw score 150 in the distribution. Every raw score was thus treated separately, making a total range roughly from 20 to 0, with the score 10 at the mean of a 6-Sigma distribution, i.e., —3 Sigma to the left and +3 Sigma to the right.

This procedure was repeated for all the other factors except for Practice Teaching and Scholarship. The raw scores for these were first thrown into percentile ranks, and then given a theoretical Sigma score based on the use of Rugg's[2] tables. This Sigma score was treated as the others, i.e. multiplied by 3 and 10 added, except that 3 times Rugg's Score + 1 algebraically is the same as 3 times Sigma Score + 10 algebraically.

For example, the student who before offered 0 units of Latin for entrance, had an Army Alpha score of 150, a Terman of 130, and graduated from the third Quartile of his class would have the following S.D. Scores:

5.5 For Latin Entrance Units,
11. for Army Alpha,
9. for Terman, and
5. for Quartiles.

(5.5 or 5) — (11) — (9) — (5) are just the same rank as the raw scores, and are much easier to use in all sorts of combinations for correlations and percent calculations. These Scores will be known as Standard Deviation or S.D. Scores hereafter in computations.

The problem of this study is to take the factors herein described, namely Entrance Units of Latin, Quartile Rank in secondary school, Army Alpha, Terman Group Test at entrance or first year, and try to describe and predict what one may expect to find in terms of Practice Teaching Scores, Scholarship and Persistence in School. The raw information

[2]Rugg, H. O.: Statistical Methods Applied to Education, 396.

may be very reliable or moderately so; that cannot be positively known. The problem is to treat this data accurately with appropriate mathematical technique, checking for accuracy and being careful of errors in order that the results may be reliable in terms of the information accepted.

CHAPTER III

DESCRIPTION OF CLASS

The first question is, what places and what secondary schools supply the School of Education with students? Table 2 shows the secondary schools from which the class came; the number of men and women from each secondary school; graduates from the School of Education and non-graduates.

The class is composed of 143 women and 10 men. By far the greater number come from Philadelphia high schools, West Philadelphia High School leading with 34, while other high schools in the city bring the total to 102 students, or almost two-thirds of the entire group. The suburban sections and nearby towns add 25, making about five-sixths that come from Pennsylvania. New Jersey high schools add 16, and the remaining 10 come from widely scattered high schools. Only two of the ten coming from a distance graduated. Whether the distance is significant cannot be judged by such small numbers.

Of the one hundred and fifty-three students, 108, or 72%, graduated, while forty-five, or 28%, failed to finish. Forty were marked "Excluded on account of poor scholarship" on their record cards in the Dean's office, one dropped out without any reason indicated, though the grades were good, and four transferred to other institutions.

How does the entering class compare as a group with other college and university groups? Chart I shows the class of the School of Education as contrasted with the Literate White Draft, high school freshmen and college and university freshmen. The chart is adopted from Koos.[1] The entering group from the School of Education is inserted in this chart on the same scale with his other groups. As compared with other groups on the scale, the Education class is above the normal of the college and university freshmen.

[1]Koos, L. V.: American Secondary School, Fig. 22, 122.

TABLE 2

TABLE SHOWING THE SECONDARY SCHOOLS WHICH CONTRIBUTED TO THE ENTERING CLASS OF 1923-1924 OF THE SCHOOL OF EDUCATION, UNIVERSITY OF PENNSYLVANIA WITH THE NUMBERS THAT GRADUATED FROM THE SCHOOL OF EDUCATION FROM EACH HIGH SCHOOL

			Graduating from School of Education		Not Graduating From School of Education		
PHILADELPHIA HIGH SCHOOLS:	Boys	Girls	Boys	Girls	Boys	Girls	Total
West Philadelphia	0	34	0	25	0	9	34
Germantown	1	11	1	11	0	0	12
South Philadelphia	6	5	6	5	0	0	11
Philadelphia High for Girls	0	12	0	7	0	5	12
Kensington	0	9	0	6	0	3	9
William Penn	0	7	0	3	0	4	7
Catholic Girls' High	0	6	0	3	0	3	6
Frankford	0	4	0	4	0	0	4
Central	2	0	2	0	0	0	2
Notre Dame Academy	0	2	0	1	0	1	2
Long Hills	0	1	0	1	0	0	1
St. Mary's High	0	1	0	0	0	1	1
Friends' Central	0	1	0	1	0	0	1
Total	9	93	9	69	0	25	102

Pennsylvania High Schools Outside of Philadelphia:			Graduating from School of Education		Not Graduating From School of Education		
	Boys	Girls	Boys	Girls	Boys	Girls	Total
Nanticoke	0	3	0	3	0	0	3
Upper Darby	0	3	0	2	0	1	3
Norristown	0	3	0	1	0	2	3
Narberth	0	3	0	2	0	1	3
Spring City	0	2	0	2	0	0	2
Old Forge	0	1	0	1	0	0	1
Lansdowne	0	1	0	1	0	0	1
North Wales	0	1	0	1	0	0	1
Brockport	0	1	0	1	0	0	1
Center Square	0	1	0	1	0	0	1
Media	0	1	0	0	0	1	1
Chester	0	1	0	0	0	1	1
Hanover	0	1	0	0	0	1	1
Cheltenham	0	1	0	1	0	0	1
Erie	0	1	0	1	0	0	1
Total	0	25	0	18	0	7	25

New Jersey High Schools:	Boys	Girls	Graduating from School of Education		Not Graduating From School of Education		Total
			Boys	Girls	Boys	Girls	
Camden	0	3	0	3	0	0	3
Collingswood	0	3	0	1	0	2	3
Trenton	0	2	0	1	0	1	2
Woodbine	0	2	0	2	0	0	2
Woodbury	1	1	1	1	0	0	2
Atlantic City	0	2	0	1	0	1	2
Newark	0	1	0	0	0	1	1
Haddonfield	0	1	0	0	0	0	1
Total	1	15	1	9	0	5	16

Miscellaneous High Schools:			Graduating from School of Education		Not Graduating From School of Education		
	Boys	Girls	Boys	Girls	Boys	Girls	Total
Maryland: Baltimore	0	1	0	0	0	1	1
Elkton High School at Childs	0	1	0	0	0	1	1
Delaware: Laurel	0	1	0	1	0	0	1
Madisonville	0	1	0	0	0	1	1
Wilmington	0	1	0	1	0	0	1
Montana: Miles City	0	1	0	0	0	1	1
Tennessee: Johnson City	0	1	0	0	0	1	1
Indiana: Evansville	0	1	0	0	0	1	1
Florida: St. Petersburg	0	1	0	0	0	1	1
Virginia: Norfolk	0	1	0	0	0	1	1
Total	0	10	0	2	0	8	10

Yoakum and Yerkes[1] found, in a distribution of 3,175 men and 1,575 women students taken from twenty colleges for men and thirteen colleges for women, the following significant measures: the range for college men on the Army Alpha is from score 205, the highest, to 15, the lowest. The women range from a score of 195 to 25. The median score is 127 for the women, lower quartile 106, upper quartile 142. For the men: 130 median, lower quartile 105, upper quartile 150.

The Army Alpha is supposed to be a test better suited to men than to women, since the men get higher scores than the women, but the difference is slight. Table 2 shows the medians, lower and upper quartiles of women in colleges and universities and women's colleges in rank order and with the entering class of the School of Education inserted.[2] According to this table, as given by the authors of The Army Mental Tests, the School of Education students rank with the highest, i.e., Colorado College.

Whitney, in a distribution of Army Alpha scores for the graduates of 780 state normal school graduates, gives a median of 135 and a Sigma 22.15, as compared with a median of 144 and a Sigma of 24.30 for the class studied. The Normal School group being somewhat below this group, though they are two years older chronologically.

Chart II shows the curve of the entering class as measured by the Army Alpha Test, contrasted with the normal probability curve drawn for this group. The normal probability curve shows a theoretically perfect distribution of this group on each side of a central tendency. The true curve is slightly skewed to the left. Whether the Army Alpha is too easy, or the group too highly selected one cannot say. Perhaps the Army Alpha is, considering the skewness of the true curve, too easy a test for this group, if a normal distribution is expected.

As measured by the Army Alpha, the entering class to the School of Education ranks very high with other groups

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[1]Yoakum and Yerkes: Army Mental Tests, 163.
[2]Yoakum and Yerkes, opus cit., 168.

TABLE 3[1]

Median of College Women	127
Lower quartile	106
Upper quartile	142
Median of College Men	130
Lower quartile	105
Upper quartile	150

	Median Quartile	Lower Quartile	Upper Quartile
University of Pennsylvania School of Education	144	125	150
Colleges:			
Colorado College	142	125	156
University of Minnesota Freshmen	128	109	145
University of North Dakota	129	107	153
State Teachers' College	122	100	141
Southern Methodist University	123	102	141
University of Idaho	117	99	139
13 Colleges Combined	127	106	142

reported by Whitney, Koos, Yoakum and Yerkes from other colleges and universities. It can be safely assumed that the School of Education draws a highly selected group; high in intelligence and intellect, ranking on a par at least with other college and university groups, and higher than normal schools.

In the Army Alpha where C represents the middle group, this group falls in the A and B classes of the country as a whole. The knowledge of the quality of the entering class should be of significance in preparing courses for students of this intellectual level.

Chart III shows intelligence of the entering class as measured by the Terman Group Test, Form A. The curve shows much more skewness than does that of the Army Alpha,

[1]Yoakum, R. M., and Yerkes, C. S.: Army Mental Tests, 168. Henry Holt and Company, 1920.

too many scores being lumped together in the high end of the scale. Using the formula[1]

$$\frac{3\ (\text{mean} - \text{median})}{\text{Standard Deviation}}$$

to show the degree of skewness of the two curves, the Army Alpha has a skewness of —.30, i.e. skewed negatively or to the left, and Terman, —.55 in the same direction, with a difference of .25 in the curves. The Army Alpha is more symmetrical than the Terman[2] since it more nearly approximates a normal distribution. Although the Army Alpha gives a more normal distribution than the Terman, it will be shown later to be not as good for predictive purposes as the Terman.

Of the 155 students, two cases were discarded because of insufficient data, 108 graduated, and 45 did not. Of these 45 students, 4 were either transferred to other schools or granted a leave of absence; the remainder, 41 students, dropped out mostly at the end of their freshman year, with "Excluded on account of poor scholarship" on their cards. What was the reason for the poor scholarship? Was it lack of intelligence or intellect, determination or will, ambition or interest, or was it due to economic or social or health factors? An attempt to answer these questions will come later.

Chart IV gives the curve from Army Alpha scores for the 108 students who graduated and for the 43 students who dropped out. The four students who transferred to other institutions are shown by cross section blocks.

The significant measures of the two graphs are as follows:

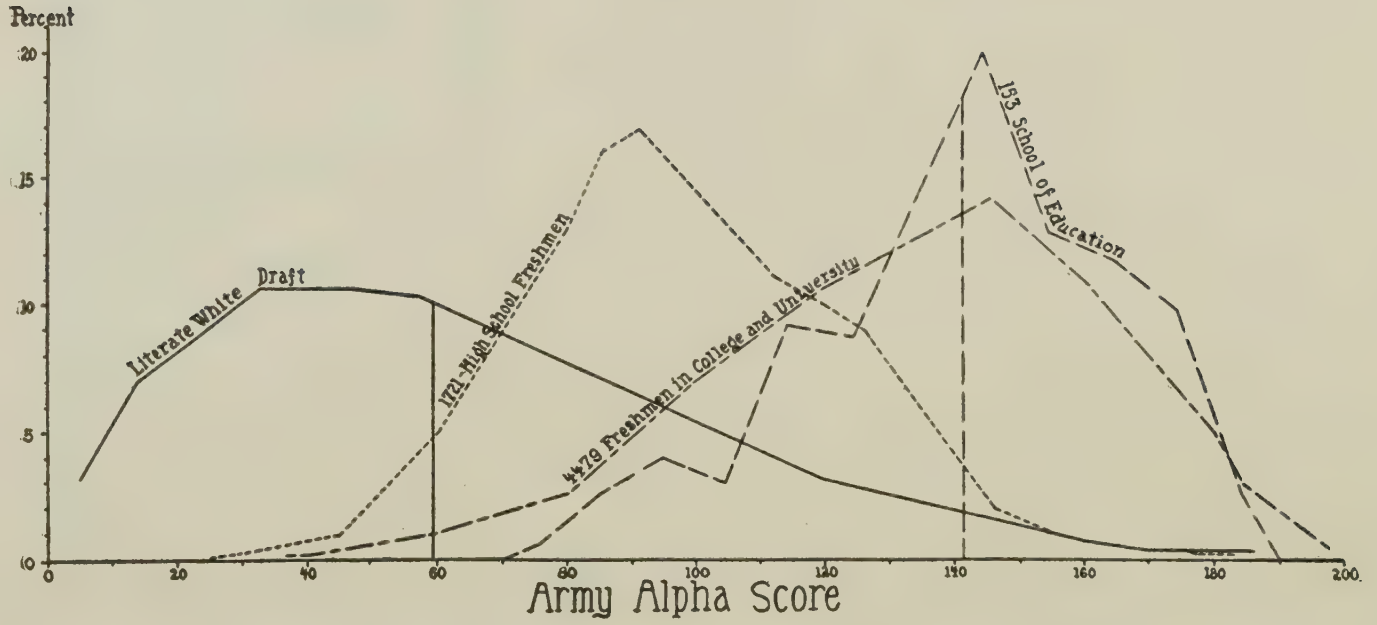
	Range	Median	Mean	Sigma
Graduates	100	145.5	143.25	24.0
Drop-outs	105	141.4	137.7	23.5

Inspection of the relationship of these significant measures and the two graphs reveal a slight superiority of the group of graduates over the group of non-graduates in so-called in-

[1]Garrett: Statistics in Psychology and Education, page 86.

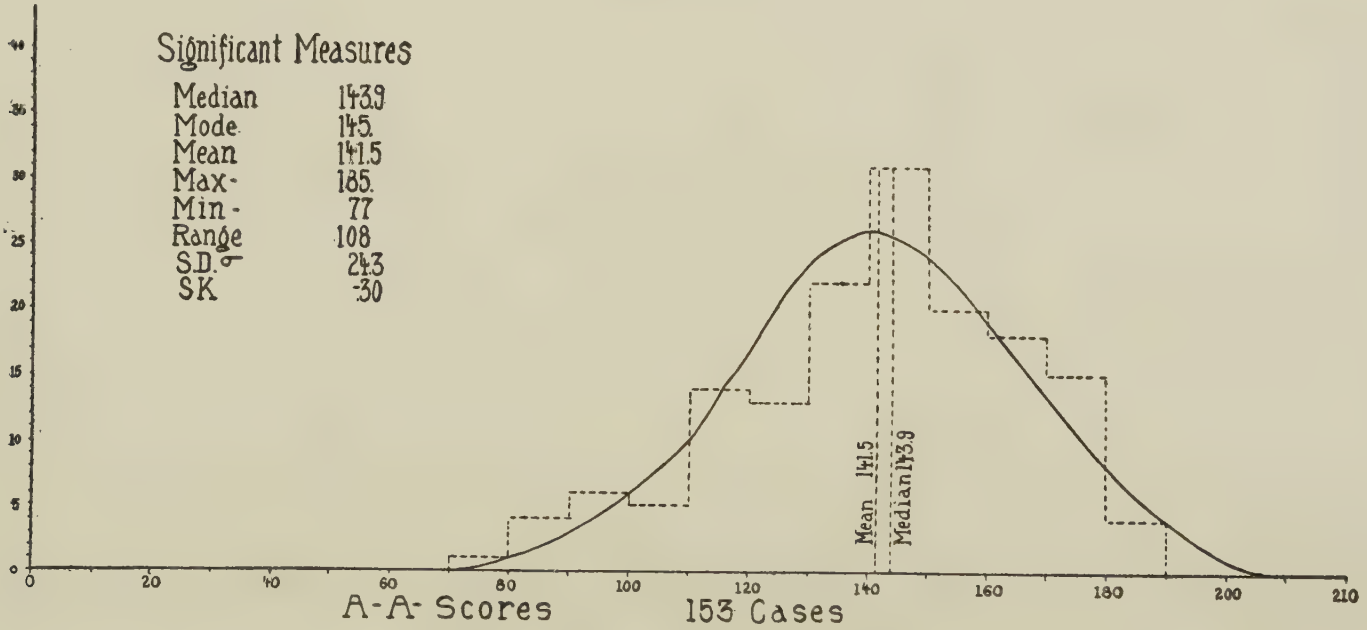
[2]Later on in the study, the Terman shows more predictive value than the Army Alpha. This may be due to chance, however. Two of the 18 cases in the highest group of the Terman Group Test made perfect scores.

CHART I



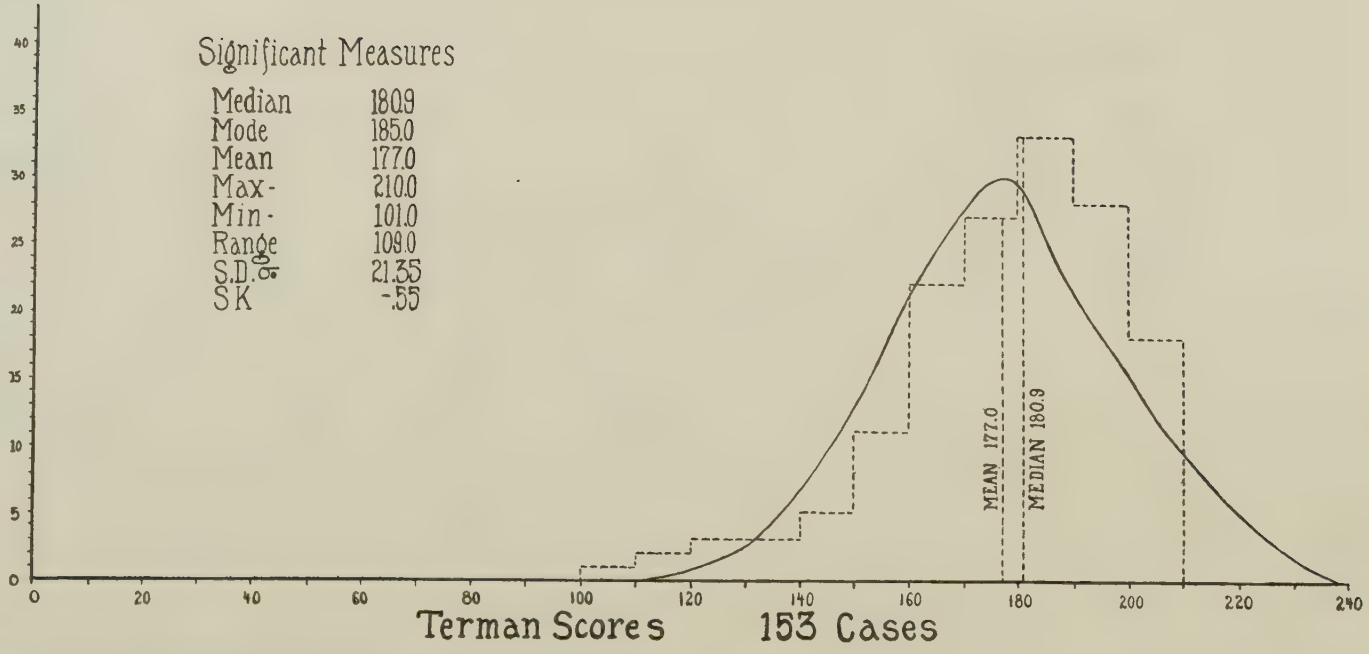
This Chart is adapted from a chart in The American Secondary School, by L. V. Koos, page 122. The entering class is drawn in according to the same scale. The curve compares well with the 4,479 freshmen in colleges and universities.

CHART II



Shows the entering class as measured by the Army Alpha; the theoretically perfect normal curve for the group is drawn in according to scale.

CHART III



Shows the same in relation to the Terman Group Scores.

CHART IV

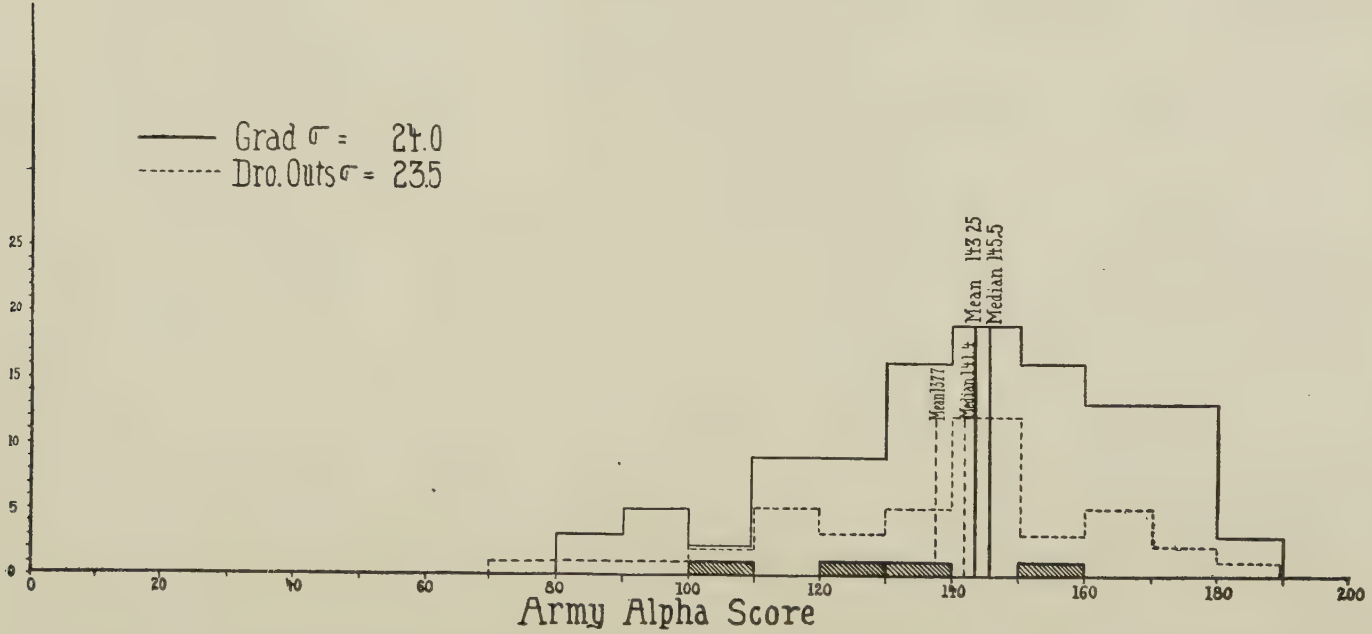


Chart shows the relation of the graduates and drop-outs according to the Army Alpha; the distributions are much the same.

telligence, as measured by the Army Alpha. However, this difference is not alone a sufficient cause for leaving the School of Education. Other causes will have to be found besides the lack of potential intellectual ability.

An analysis of these groups shows the following facts:

Score: 165-185, 1-4 approximately dropped out.
140-160, 3-7 " " "
110-135, 1-3 " " "
90-110, 1-2 " " "
80- 85, the chances are 1 to 1.
75- 80, all will drop out, judging from the scores of the drop-outs and graduates of this group.

As one would expect, the largest percentage dropped out, namely 50 percent, from scores 90 to 110. However, as far as intelligence is concerned as measured by this test, and assuming that the scores are a true index of what the Army Alpha measures, every student had a chance of graduating except one. That is to say, other causes will have to be sought for that had as much or more to do with "Excluded on account of poor scholarship" than did the score. To ascertain these causes, a questionnaire was sent to the drop-outs. The results of this questionnaire will be discussed later.

How do the members of the class rank in scholarship as measured by Quartiles from high schools?

85 students, or 55 percent graduated from the first quartile.
37 students, or 24 percent graduated from the second quartile
24 students, or 16 percent graduated from the third quartile
6 students, or 5 percent graduated from the fourth quartile

The influence of scholarship as shown by Quartiles at entrance to college is significant, as nearly 80 percent of the group come from the first and second quartiles of their respective classes. The importance of quartile rank will be shown later in the study.

Units offered for entrance varied little from the usual offering of high schools to meet college entrance requirements.

Every student offered four units of English. History and social sciences varied from 2 to 3 units. Mathematics and science varied from 1 to 3 units. Electives were supplied by extra units in the above fields and the addition of some commercial subjects. Practically every student offered the same subjects in the same amounts in slight variations, with the exception of Latin. Here a large variation was found from zero to four years. This was considered significant and used.

CHAPTER IV

THE RELATION OF MAJORS TO INTELLIGENCE AND CERTAIN OTHER FACTORS

Does subject matter have any selective value? Is there any relationship between the subjects taken as majors and the scores made on intelligence tests? Is interest of one sort or another the only motive for selecting a major, or is this selection conditioned also by certain other psychological factors, of which ability plays a part? Are interest and ability closely related, or the reverse? Does the selection of a particular subject by a student or a group of students for a major, indicate a level of intellectual ability as measured by so-called intelligence tests? This study does not attempt to answer these questions because of the small number of cases under each major. However, since in the School of Education students are free, within limits, to choose majors according to their own wishes, certain trends may be discovered.

In order to answer these or similar questions, the class was grouped according to majors. Tables 4 and 5 show the numbers of students that majored in each subject plus their average rating in various factors.

In Table 4 this rating is shown in terms of Standard Deviation scores. Column 8 shows the average of the Standard Deviation scores for the Quartile rank in High School, Army Alpha and Terman scores. On the basis of this average, the majors have been listed in rank order. Column 3 shows the number of students majoring in each subject. English, history, mathematics and Latin comprise the majors chosen by about eighty percent of the class.

Table 5 is similar to Table 4 except that it shows the relation of majors to the various factors in terms of original scores instead of in terms of Standard Deviation scores. Inspection of these tables shows that on the basis of Quartiles and intelligence tests, Latin and mathematics majors rank

TABLE 4

MAJORS IN RELATION TO STANDARD DEVIATION SCORES

1 Rank	2 Major	3 Number of Cases	4 Entrance Units of Latin	5 Quartile Rank in H. S.	6 Average Army Alpha Score	7 Average Terman Score	8 Composite Scores of Factors 5–6–7	9 Scholarship	10 Practice Teaching	11 Composite Scores Columns 9 and 10
1	Latin	12	12.2	11.7	11.4	10.7	11.27	12.2	10.7	11.45
2	Mathematics	17	10.0	11.1	10.7	11.8	11.20	12.8	11.1	11.95
3.5	French	6	10.9	9.6	11.6	12.1	11.10	12.0	9.7	10.85
3.5	Botany	3	8.3	12.0	11.3	10.0	11.10	12.0	9.0	10.5
5	Psychology	9	10.8	10.9	10.3	12.0	11.07	10.4	10.2	10.3
6	Chemistry	3	11.6	10.0	12.0	10.6	10.87	11.3	11.3	11.3
7	English	36	10.5	9.5	9.9	9.9	9.77	10.5	9.4	9.95
8	History	19	9.9	9.7	9.2	9.3	9.4	10.5	9.6	10.05
	Commercial Education Fine Arts	3	12.6	11.0	12.3	10.3	11.55	10.3	12.0	11.15

This table shows the subjects offered as majors by 108 graduates. The subjects are ranked according to the rank of the Composite Score, Column 8, (which is the average of the Quartile, Army Alpha and Terman scores).

Columns 4 to 7 show the average Standard Deviation scores of each of these factors for each group. Column 8 is the average of Columns 5 to 7. Columns 9 and 10 show average Standard Deviation scores for Scholarship and Practice Teaching. Column 11 is the average of Columns 9 and 10.

TABLE 5

MAJORS IN RELATION TO RAW SCORES

1 Rank	2 Major	3 Number of Cases	4 Entrance Units of Latin	5 Quartile Rank in H. S.	6 Average Army Alpha Scores	7 Average Terman Scores	8 Average Scholarship Mark	9 Practice Teaching Mark
1	Latin	12	3½	I	153	182	G	G+
2	Mathematics	17	2½	I	147	190	G+	G+
3.5	French	6	3	II	155	192	G	G
3.5	Botany	3	2	I	152	177	G	G
5	Psychology	9	3	I	144	191	G—	G+
6	Chemistry	3	3½	II	159	181	G	G+
7	English	36	3	II	141	176	G—	G
8	History	19	2½	II	135	172	G—	G
	Commercial, Education and Fine Arts	3	4	I	161	179	G—	D—

This Table is similar to Table 4 except that the average raw scores are used instead of the average Standard Deviation scores. This Table shows that those who majored in Latin rank first. They offered 3½ units of Latin at entrance, graduated from the first Quartile of their class in a secondary school, and had an average Army Alpha of 153, Terman 182, an average of G in Scholarship in the School of Education and G+ in Practice Teaching, etc. The Table is more significant when the foreign languages, science and mathematics scores are contrasted with English and history.

higher than the average, for the group, and English and history below the average.

The Standard Deviation scores of each major showed little variation from the average, with the exception of English. Here there was an extremely wide variation. One student who majored in English received a composite score, based on four units at entrance, of 13.5, and 14 on Practice Teaching and Scholarship combined, while the lowest student who majored in English received a composite score of 5.75, based on four factors at entrance, and a score of 8 on Practice Teaching and Scholarship combined, a difference in range of 7.75 between the two students. The first student was at the top of the group in all factors, while the second was near the the bottom. The group ranges from the highest to the lowest, and shows much more variability than the other groups. An explanation of this is possibly that, while English does select the highest in ability, it also offers an avenue for the less endowed to graduate. A student can major in English when it would be less likely for him to meet the requirements of a major in such subjects as Latin or mathematics.

Further analysis of these tables indicates that there is a certain degree of relationship between subject matter and intelligence. In terms of Standard Deviation scores, mathematics ranks first with a Standard Deviation score of 11.25. Latin ranks next with a score of 11.05, English third, with a score of 9.90, and history, 9.25. The difference between the average intelligence scores made by the students who majored in mathematics and the students who majored in history is 2 points in Standard Deviation scores, which is 2-3 of a Standard Deviation. This is a rather significant difference.

In this connection, it is interesting to compare the median Army Alpha scores as reported by Terman[1] from University departments of Ohio State University and from the different schools in the University of Illinois:[2]

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[1]Terman, L. M.: Intelligence Tests in Colleges and Universities. School and Society, XIII: 481. April, 1921.

[2]Ibid.

TABLE NUMBER 6

MEDIAN ALPHA SCORES BY UNIVERSITY DEPARTMENTS

Ohio State University		*University of Illinois*	
Liberal Arts	147	Law	163
Medicine	142	Liberal Arts	147
Law	142	Commerce	140
Engineering	141	Engineering	140
Agriculture	133	Agriculture	139
Pharmacy	125	Music	121
Dental College	115		
Veterinary College	112		
Special Students	127		
Graduate Students	157		
Entire University	136		

Table 7 gives the median Army Alpha scores required for the "A" grade at Miami University, which is the same as the "D" grade in the University of Pennsylvania. These tables in a general way agree with the finding of the study.

TABLE NUMBER 7

AVERAGE ALPHA SCORES REQUIRED TO GET "A" IN VARIOUS SUBJECTS AT MIAMI UNIVERSITY

Subject	*Median Alpha Score*	*No. of Cases*
Philosophy	162	31
Physics	162	34
Mathematics	157	79
Economics	157	71
Psychology	156	14
Sociology	156	29
Chemistry	155	60
Greek	155	45
Latin	151	35
English	151	212
Spanish	150	51
French	149	121

History	145	69
Political Science	144	40
Zoology	142	30
Botany	140	20
Geography	137	21
Drawing	132	24
Music	132	23
Home Economics	126	10

In regard to Quartiles, the situation is almost the same as was found in regard to intelligence. The rank is in the following order: Latin has a Standard Deviation score of 11.7; mathematics, 11.1; history, 9.7; English, 9.5. The difference between Latin and English is 2.2 points on the Standard Deviation score, which is a difference of a little more than two-thirds of a Standard Deviation.

In this connection it may be significant to note the achievement of these different groups after entrance in the School of Education. In Scholarship the mathematics group ranks first with a Standard Deviation score of 12.8; the Latin group is second with a Standard Deviation score of 12.2, and English and history groups third with Standard Deviation scores of 10.5 each. The difference here is 3.3 points of a Standard Deviation score, or over one Standard Deviation. Part, or all, of this difference may be due to the difference in intelligence and rank in Quartiles.

In Practice Teaching the difference is not so marked. The four majors under consideration rank in this order: Mathematics has a Standard Deviation of 11.1, Latin 10.7, history 9.6, and English, 9.4. The range is 1.7, which is a little over half a Standard Deviation.

In the preceding discussion the relation of the various factors to French, botany, psychology and chemistry was not included because of the small number of cases in each subject. There were a total of twenty-one students who majored in these four subjects. Generally speaking, they ranked lower than Latin and mathematics, and higher than English and history.

SUMMARY

From this analysis of majors in the School of Education and a comparison with the scores given by Terman from departments in universities and colleges, it would appear that subject matter might have a selective quality in terms of scores made on intelligence tests. However, further study should be made which would point out other factors besides intelligence, and more precisely define the role that intelligence plays in the choice of subject matter.

CHAPTER V

PREDICTION OF PERSISTENCE IN SCHOOL, SCHOLARSHIP AND PRACTICE TEACHING BY MEANS OF STANDARD DEVIATION SCORES

A. *Persistence in School—*

What relation do entrance units of Latin and Quartile rank in high school, Army Alpha scores and Terman scores have to persistence in school as measured by credits earned in the School of Education?

I. Units of Latin:

Table 8 shows the proportion of the class that graduated was 72 percent, that failed, 28 percent. In studying the class, the percentage that graduated may be considered normal for the class.

By dividing the class into three main groups, based on the number of units of Latin offered at entrance, there are:

1. The no-Latin group.
2. Those offering two years.
3. Those offering three and four years.

From inspection of the table, the group that offers no Latin at all is not as good an educational risk as the average of the class.

Of those offering two years of Latin, 205 percent of the normal proportion dropped out. What possibly might have happened in this group is that in high school the poorer students were those who tried Latin for two years and gave it up. Of the three or four unit Latin group, about 70 percent of the normal proportion dropped out, which is considerably less than for the other two groups.

II. Quartiles:

Quartiles show a higher degree of relationship to persistence in school than any of the other factors. In the fourth Quartile, about 300 percent of the normal for the class dropped

TABLE 8

PERSISTENCE IN SCHOOL IN RELATION TO THE FOUR FACTORS AT ENTRANCE

					The Median lies in this Block	
Entrance (1) Units of Latin	Years of Latin	0–½	1–1½	2–2½	3–3½	4
	Number of Cases	38	4	19	15	73
	Percent Graduating	69	75	42	87	80
	Percent not Graduating	31	25	58	13	20
(2) Rank in Quartiles	Quartiles	4th	3rd	2nd	1st	
	Number of Cases	6	24	37	82	
	Percent Graduating	17	62.5	60	86	
	Percent not Graduating	83	37.5	40	14	
(3) Army Alpha	Score		73–97	98–121	122–161	162–186
	Number of Cases		11	20	83	35
	Percent Graduating		73	60	73	77
	Percent not Graduating		27	40	27	23
(4) Terman	Score		100–137	138–159	160–194	195–210
	Number of Cases		8	15	95	31
	Percent Graduating		75	60	70	84
	Percent not Graduating		25	40	30	16

This table shows the distribution of: (1) Entrance Units of Latin; (2) Quartiles; (3) Army Alpha, and (4) Terman scores. It shows for each group the percent graduating and the percent not graduating. Of the whole class, 72 percent graduated, and 28 percent did not.

Table reads as follows: There were 38 cases who offered zero to ½ units of Latin. Sixty-nine percent of these graduated and 31 percent did not. Of those who ranked in the Fourth Quartile from their graduating class in a secondary school, out of six cases 17 percent graduated and 83 percent did not.

Of those making a score on the Army Alpha from 73 to 97, out of eleven cases, 73 percent graduated and 27 percent did not. Terman reads the same as Army Alpha.

out. In the second and third Quartiles, about 140 percent of the normal for the class dropped out. In the first Quartile, only fifty percent of the normal for the class dropped out.

III. Army Alpha:

In the Army Alpha, of those who made an average score, the average number dropped out for the class. In the lower group, about 25 percent more than the average dropped out.

In the group above the average, twenty percent less than the average dropped out. It might be noted, however, that in the very lowest group, from 97 down, the average proportion dropped out. This shows Army Alpha has some slight predictive value, but that a very low Army Alpha score is not an indication of a poor persistence risk. It should be remembered, however, that these very lowest scores are high in comparison with average scores of the adult population of the country.

IV. Terman:

With the Terman scores, the situation is much the same, the lowest and the average groups showing about a normal proportion of drop-outs.

The next to the lowest group has somewhat above the normal proportion dropping out. The group above normal shows the lowest proportion dropping out, approximately 45 percent lower than the normal. The student with the highest Terman score is almost twice as good as the normal risk. Terman scores, therefore, show a considerably better prediction than the Army Alpha.

V. Summary:

For predicting persistence in schools, the Quartiles possess a high degree of reliability. The other factors rank in this order: Entrance Units of Latin, Terman and Army Alpha. Entrance Units of Latin show a danger point at two units. Terman shows highly predictive value from 195 to 210.

B. *Scholarship*—

Tables 9 and 10 show the general relationship of the factors. Each one of the factors will be studied more in detail in tables 11 to 14.

TABLE 9

SCHOLARSHIP IN RELATION TO STANDARD DEVIATION SCORES OF THE FOUR FACTORS AT ENTRANCE

Scholarship in School of Education	Number of Students	Entrance Units of Latin	Rank in Quartiles	Army Alpha Scores	Terman Scores	Composite Scores
D	6	9.5	11.7	11.7	12.7	11.40
G	106	10.5	10.7	10.6	10.4	10.55
P	33	8.8	8.2	8.1	9.1	8.56
N–F	8	9.5	6.7	8.3	8.5	8.32
Total	153	10.06	9.99	9.99	10.11	10.04

This table shows for each scholarship group the average Standard Deviation Scores in each of the four entering factors. The right-hand column shows the average of these Standard Deviation Scores and indicates the rank. Those who received the highest grade "D" in Scholarship for four years in the School of Education also stood highest in all the entrance factors except Units of Latin.

Two significant facts on this table are the high Terman scores of the "D" students and the low Quartile rank of the "N" and "F" students.

TABLE 10

SCHOLARSHIP IN RELATION TO THE FOUR FACTORS AT ENTRANCE

Scholarship Students	Number of Students	Entrance Units of Latin	Rank in Quartiles	Average Army Alpha Score	Average Terman Score
D	6	2½ yrs.	Middle of 1st Q.	155	196
G	106	3 yrs.	Bottom of 1st Q.	146	180
P	33	2 yrs.	Middle of 2nd Q.	126	171
N–F	8	2½ yrs.	Top of 3rd Q.	128	166

This table is similar to Table 9 except that the Standard Deviation scores have been changed back again to the original scores. The average "D" student has offered 2½ years of Latin, graduated from the middle of the First Quartile of his class in a secondary school, and has had an Army Alpha score of 155 and a Terman score of 196 at entrance.

I. Relationship between Scholarship and Entrance Units of Latin.

Table 11 shows that those offering no units of Latin get a slightly lower scholarship average than is normal for the class.

Those offering three or four units of Latin get a noticeably higher scholarship average, and those offering two years of Latin get a decidedly lower scholarship average than the normal.

II. Relationship of Scholarship to Quartiles:

Table 12 shows that a high degree of relationship exists between Scholarship and Quartiles. Of those in the fourth Quartile, none get D. Over three times the normal proportion of the class get P's, N's or F's. Of those in the third Quartile, none get D's, and 70 percent more than the normal proportion get P's, N's and F's. In the second Quartile, slightly less than normal get D's, and 55 percent more than the normal proportion get P's, N's and F's.

In the first Quartile, fifty percent more than the normal proportion get D's and 63 percent less than the normal get P's, N's and F's.

III. Scholarship and Army Alpha:

The Army Alpha scores indicate a distinct positive relationship to Scholarship as shown by Table 13. Of those in the lowest Army Alpha group, none has an average of D, and over twice as many have P's, N's and F's. In the next to the lowest group, none has D. About sixty percent more than the average have P's, N's and F's.

In the group which is above average in Army Alpha, over twice as many have D's as the average for the class, and but a few over one-third as many have P's, N's and F's as the average of the class.

IV. Relation of Scholarship to Terman Scores:

Terman scores, according to Table 14, show about the same prediction as the Army Alpha scores, except that there

TABLE 11

SCHOLARSHIP IN RELATION TO ENTRANCE UNITS OF LATIN

PERCENTS RECEIVING EACH MARK

Average Scholarship Mark	0 Years of Latin	1 Year of Latin	2 Years of Latin	3 Years of Latin	4 Years of Latin	Total
D	5	0	6	0	4	4
G	60	50	42	81	80	69
P	30	50	42	6	13	22
N–F	5	0	10	13	3	5
Number of Cases	39	4	19	16	75	153

Table reads: Of the 39 students who offered no years of Latin, five percent got an average Scholarship of D, 60 percent G, thirty percent P, five percent N and F.

TABLE 12

SCHOLARSHIP IN RELATION TO QUARTILES

PERCENTS RECEIVING EACH MARK

Average Scholarship	Fourth Quartile	Third Quartile	Second Quartile	First Quartile	Total
D	0	0	3	6	4
G	17	54	55	84	69
P	50	38	34	9	22
N–F	33	8	8	1	5
Number of Cases	6	24	38	85	153

This table reads as follows: Of those who received an average Scholarship grade of D in the School of Education, none were in the Fourth Quartile of their graduating class from a secondary school, etc.

TABLE 13

SCHOLARSHIP IN RELATION TO ARMY ALPHA SCORES

PERCENTS RECEIVING EACH MARK

Average Scholarship Mark	Army Alpha Score 73–97	Army Alpha Score 98–121	Army Alpha Score 122–161	Army Alpha Score 162–186	Totals
D	0	0	4	9	4
G	36	57	71	80	69
P	64	30	19	11	22
N–F	0	13	6	0	5
Number of Cases	11	23	84	35	153

Table reads as follows: Of those who received an Army Alpha score from 73 to 97 at entrance to the School of Education, none got an average mark of D in Scholarship while in college, etc.

TABLE 14

SCHOLARSHIP IN RELATION TO TERMAN SCORES

PERCENTS RECEIVING EACH MARK

Average Scholarship Mark	Terman Score 100–137	Terman Score 138–159	Terman Score 160–194	Terman Score 195–210	Totals
D	0	0	2	13	4
G	67	56	69	77	69
P	33	31	23	10	22
N–F	0	13	6	0	5
Number of Cases	9	16	97	31	153

This table reads the same for Terman as does Table 13 for Army Alpha.

is less relationship between low Terman scores and low Scholarship scores than was the case of the Army Alpha test—and more correspondence between high Terman scores and high Scholarship scores than was true in Army Alpha.

V. Scholarship and Composite Scores:

Table 15 shows that Composite Scores predict better than Intelligence scores, and not quite as well as Quartiles.

VI. Summary:

In summarizing this prediction of Scholarship, it may be said that a low Quartile rank shows a very high probability of poor scholarship. On the other end of the scale, Intelligence scores are a better prediction of D scholarship than is Quartile rank. Of the two tests, Terman predicts D scholarship better than does Army Alpha. The reason that Quartiles do not predict scholarship may be found in the fact that there are 85 cases in the first Quartile and only 31 cases in the upper portion of Terman. This means that the Terman test is more discriminating in the upper ranges. In general, the factors rank in this order: Quartiles, Terman, Army Alpha and Entrance Units of Latin.

C. *Practice Teaching.*

Tables 16 and 17 show that each one of the factors bears a positive relationship to Practice Teaching. It shows about the same relationship between the four factors and Practice Teaching as was shown between these factors and Scholarship.

These four factors rank in predictive value as follows:

1. Quartiles.
2. Terman.
3. Army Alpha.
4. Entrance Units of Latin.

The Composite scores rank next to the Quartiles in predictive value. Scholarship shows a high degree of correspondence with Practice Teaching. Those who receive D in Practice Teaching are one Standard Deviation above the average in Scholarship. Those who did not graduate and, therefore, did

TABLE 15

SCHOLARSHIP IN RELATION TO COMPOSITE SCORES

PERCENTS RECEIVING EACH MARK

Average Scholarship Mark	Sum of S. D. Scores 21–28	Sum of S. D. Scores 29–36	Sum of S. D. Scores 37–44	Sum of S. D. Scores 45–52	Totals
D	0	0	4	7	4
G	29	50	84	80	69
P	57	36	12	11	22
N–F	14	14	0	2	5
Number of Cases	14	36	49	54	153

The Composite Scores are the sums of all of the Standard Deviation scores for each mark, D, G, P, etc. Table reads as follows: Of those having Standard Deviation scores at entrance between 21 and 28, zero percent will get "D" in Scholarship in the School of Education, etc.

TABLE 16

PRACTICE TEACHING MARKS IN RELATION TO FOUR FACTORS AT ENTRANCE

Number of Students	Practice Teaching Marks	Entrance Units of Latin	Quartile Rank in H. S.	Army Alpha Scores	Terman Scores	Scholarship	Composite Scores
28	D	10.7	11.2	11.3	11.4	13.0	11.15
63	G	10.3	10.6	9.7	10.0	10.7	10.15
17	P	9.8	9.5	10.4	10.3	9.7	10.0
41	N. G.	9.4	8.1	9.4	9.3	6.9	9.05

This table shows for each Practice Teaching group the average Standard Deviation scores in each of the four entering factors. The right-hand column shows the average of these Standard Deviation scores for four factors. Some prediction is noticeable in the right-hand column, since those who rank first in the factors at entrance also get the highest marks in Practice Teaching.

TABLE 17

PRACTICE TEACHING MARKS IN RELATION TO THE FOUR FACTORS AT ENTRANCE

Practice Teaching Marks	Number of Students	Entrance Units of Latin	Quartile Rank in H. S.	Average Army Alpha Score	Average Terman Score	Scholarship
D	28	3 yrs.	Low 1st	152	187	G+
G	63	2½ "	Bottom 1st	138	177	G—
P	17	2½ "	+Middle 2nd	145	139	G—
N. G.	41	2 "	—Middle 2nd	137	172	P—

This table is similar to Table 16 except that the Standard Deviation scores have been changed back again into the original scores. That is, the 28 who received D in Practice Teaching, offer at entrance on the average of three years of Latin, are in the lower part of the First Quartile of their graduating classes, have an average Army Alpha score of 152 an average Terman score of 187, and get an average of G+ in their four years in the School of Education, etc.

not take Practice Teaching, are one Standard Deviation below the average of the class in Scholarship.

If the discussion were to be confined to the group who graduated, Entrance Units of Latin would show the same degree of prediction as Army Alpha. The other factors would retain their positions as given above. The following paragraphs show these facts in greater detail.

I. Practice Teaching in Relation to Latin Units:

Table 18 shows the percentage of the whole class getting D's, G's and P's in Practice Teaching, the total percentage graduating and the percentage not graduating. The percentage graduating and not graduating has been discussed under persistence in school, but it is also included in these tables to account for the total number of pupils in each group.

The significant thing which this table shows is the relationship between the D students and the years of Latin offered for entrance. Of those offering no units of Latin, eighty-five percent of the normal proportion get D's. Of those offering three or four units of Latin, 125 percent of the normal proportion get D's in Practice Teaching. Of those offering two units of Latin, only twenty-five percent of the normal received D's in Practice Teaching. (This is the same Latin group which was low in Scholarship.)

II. Practice Teaching and Quartiles:

Table 19 shows that of those in the Fourth Quartile, none gets D. In the third Quartile, forty percent of the normal percentage get D's. Of those in the second Quartile, seventy-five percent of the normal number get D's. Of those in the first quartile, 135 percent of the normal get D's.

III. Practice Teaching and Army Alpha:

Table 20 shows that of those with Army Alpha scores below the middle group, 34 percent of the normal receive D's, while of those receiving Army Alpha scores above the middle group, 165 percent of the normal proportion get "D's".

TABLE 18

PRACTICE TEACHING MARKS IN RELATION TO ENTRANCE UNITS OF LATIN

PERCENTS RECEIVING EACH MARK

Practice Teaching Marks	0 Years of Latin	1 Year of Latin	2 Years of Latin	3 Years of Latin	4 Years of Latin	Total
D	16	0	5	33.5	22	19
G	40	75	21	40	48	42
P	13	0	16	13.5	10	11
Total Graduating	69	75	42	87	80	72
Not Graduating	31	25	58	13	20	28
Number of Cases	38	4	19	15	73	149

Table reads as follows: Of the 38 students who offer no units of Latin, 16 percent get "D" in Practice Teaching, etc.

TABLE 19

PRACTICE TEACHING MARKS IN RELATION TO QUARTILES

PERCENTS RECEIVING EACH MARK

Practice Teaching Marks	Fourth Quartile	Third Quartile	Second Quartile	First Quartile	Totals
D	0	8	14	26	19
G	17	37.5	30	51	42
P	0	17	16	9	11
Total Graduating	17	62.5	60	86	72
Not Graduating	83	37.5	40	14	28
Number of Cases	6	24	37	82	149

Table reads as follows: Of those graduating from the Fourth Quartile of their graduating classes from a secondary school, none get "D" in Practice Teaching, etc. This table shows about the same relationship to Practice Teaching as does Table 12 to Scholarship.

TABLE 20

PRACTICE TEACHING IN RELATION TO ARMY ALPHA

PERCENTS RECEIVING EACH MARK

Practice Teaching Marks	Army Alpha Score 73–97	Army Alpha Score 98–121	Army Alpha Score 122–161	Army Alpha Score 162–186	Total
D	9	5	18	31.5	19
G	46	50	43	34	42
P	18	5	12	11.5	11
Total Graduating	73	60	73	77	72
Not Graduating	27	40	27	23	28
Number of Cases	11	20	83	35	149

Table reads as follows: Of those receiving Army Alpha scores from 73 to 97 (eleven cases), nine percent will get D, etc. It will be seen that Army Alpha is not very predictive of Practice Teaching.

IV. Practice Teaching in Relation to Terman Scores:

Table 21 shows that of those in the lowest group, none received D in Practice Teaching. Of those in the next to the lowest group, 35 percent of the normal proportion received D, while of those in the highest group, 170 percent of the normal percentage received D's.

V. Summary:

From a study of these percentages, it is seen that the factors predict D's in Practice Teaching in the following order:

1. Terman.
2. Army Alpha.
3. Quartile.
4. Latin Units.

It will be remembered that the original Standard Deviation scores in Table 16 gave a different ranking on predictive value from this ranking which we find by this analysis of the percents. The correlations in the next chapter should be a further check on the prediction by percents.

SUMMARY

1. For predicting persistence in school, Quartiles possess a high degree of reliability. Entrance Units of Latin, Terman scores and Army Alpha follow in order given. Latin Units show a higher relationship to persistence in school than they do to any other criterion.

2. For predicting low Scholarship, Quartiles are best, while for predicting D in Scholarship, Terman is best. Army Alpha comes next. Entrance Units of Latin have little or no predictive value for Scholarship.

3. Practice Teaching bears about the same relationship to the four factors as does Scholarship. That is, in general, Quartiles, Terman, Army Alpha and Entrance Units of Latin rank in order given, but for predicting "D" in Practice Teaching, as also for Scholarship, they rank: Terman, Army Alpha, Quartile and Entrance Units of Latin.

TABLE 21

PRACTICE TEACHING MARKS IN RELATION TO TERMAN SCORES

PERCENTS RECEIVING EACH MARK

Practice Teaching Marks	Terman Scores 100–137	Terman Scores 138–159	Terman Scores 160–194	Terman Scores 195–210	Total
F	0	7	18	32.5	19
G	62.5	33	44	35.5	42
P	12.5	20	8	16	11
Total Graduating	75	60	70	84	72
Not Graduating	25	40	30	16	28
Number of Cases	8	15	95	31	149

This table is the same for Terman as Table 20 for Army Alpha. Terman seems to be more predictive than Army Alpha, Quartile or Entrance Units of Latin for Practice Teaching. Why this is so is not known. Possibly it is due to chance.

CHAPTER VI.

ANALYSIS AND PREDICTION BY CORRELATIONS

Part I.

Reasons for Using the Correlation Technique

In the preceding chapter relationships were shown by percents, that is, each criterion was compared with the different factors at entrance to the School of Education in terms of the percentage relationship existing between them. The results of this method point out how many in the first Quartile of a hundred, for instance, received a certain mark in Scholarship or in Practice Teaching, or how many out of a hundred who offered a certain number of units of Latin remained in the School of Education long enough to graduate.

The method by percents does not go far enough to adequately treat the data. Other methods must be used to reveal additional facts, confirm and check the methods of percents and predict from an admittance record what is likely to happen in terms of the Criteria, Persistence in School, Practice Teaching and Scholarship in the School of Education. To solve these problems, then, of interrelations and predictions, the correlation technique was used for these reasons:

1. Raw correlations are needed to check on the relationships shown by percents.

2. Multiple correlations are needed to show the relation of all the combined factors to a criterion.

3. Partial correlations are needed to get the weights that must be attached to each factor in order to write the regression equation.

4. Finally, the regression equation is needed as a mathematical device to facilitate predictions.

Validation of Procedure

Care must be taken, however, in applying the partial correlation and the regression equation technique to data in a casual connection. To partial out the influence of certain

variables and then to use the results in attributing causal relationships is not always justifiable. [1]However, it is permissible to partial out certain factors in a number of variables in order to write the regression equation in terms of the best possible prediction.

The danger in the use of the method lies in the interpretation of the results, from a particular type of data. The following statements indicate the justification of this method in this study.

1. The use of the correlation of the order zero is sound, since these correlations show the extent of relations existing between two factors. In this study they agree with those made in studies[2] similar to this one and also agree with the findings of the percent method.

2. Since the multiple correlation expresses the relationship existing between the sum total of a number of variables and a criterion, and since in this case the average of the raw scores gives almost as high a correlation of the order zero as was expressed by the multiple correlation, the latter then is a substantial check on the validity of the former.

3. The regression equation formed from the partial correlations was [3]proved to be correct within the probable error. This would seem to indicate that at least for this class the regression equation is reliable, within the limits of its probable error, for predicting Scholarship.

Correlations of the Order Zero

In these computations the Standard Deviation scores of each student were used instead of the raw scores for all correlations and regression equations. The variables are Scholarship, Practice Teaching, Persistence in School, Latin Units,

[1]Burk, Barbara, and Kelley, T. L.: Statistical Hazards in Nature and Nurture Investigation. (The 27th Year Book of the National Society for the Study of Education, Part II: 9.)

[2]Whitney and Sommers Studies.

[3]Table 28, built up from the regression equation for predicting Scholarship on the basis of Quartiles and Terman scores, was checked by comparison with the actual Scholarship marks of a hundred students taken at random. The probable error of the table was found to be the same as the probable error calculated from the regression equation.

Quartiles, Army Alpha and Terman scores. The computations were worked out by the National Correlation Bureau, Madison, Wisconsin, Dr. C. L. Hull, Director, by machine methods, and are guaranteed correct. The correlations of the order zero are based on Karl Pearson's formula for two variables; the notation throughout is that of Yule,[1] and will be found in the Appendix.

Tables 22 and 23 give the intercorrelations between the variables. The criteria are: (1) Practice Teaching; (2) Scholarship; (3) Persistence in School. The factors are Entrance Units of Latin, Quartile rank in a secondary school, Army Alpha and Terman scores. The table is so constructed that it not only facilitates reading the direct relationships between the criteria and factors at entrance, but also the significant interrelations among criteria and factors. The reader is referred to the appendix for further relationships. The coefficient of correlation means, briefly, the degree of relationship between two variables expressing an amount or a deficiency from the respective central tendencies, that is, mean or median. This may vary from plus 1., which is a perfect positive relationship, to a —1., which is a perfect negative relationship Any correlation, say plus .43, means that any two variables from a central tendency agree .43 of a perfect relationship with each other and vice versa for the negative correlation.

The Pearson coefficient of correlation is found by the following process. Find the sum of the products of the deviations of one class by the deviations associated therewith in the other class. Divide this sum by the product of the Standard Deviation of one class multiplied by the Standard Deviation of the other class, multiplied by the whole number of cases.

$$r = \frac{\sigma x \,.\, y}{n\,(\sigma x \,.\, \sigma y)}$$

[1]Yule, G. W.: Introduction to the Theory of Statistics (6th Ed.) 247. Charles Griffin and Company, London, 1922.

TABLE 22

CORRELATIONS OF ORDER ZERO FOR 153 CASES

	Persistence in School in Credits Earned	Entrance Units of Latin	Rank in Quartiles	Army Alpha	Terman	Army Alpha and Terman	Sum of Four Factors
2. Scholarship	.655	.225	.478	.353	.342	.382	.525
3. Persistence in School in Credits Earned		.152	.333	.091	.163	.139	.277
Entrance Units in Latin	.226		.296	.209	.154	.200	
Rank in High School in Quartiles				.141	.087	.126	
Army Alpha					.654		

TABLE 23

CORRELATIONS OF ORDER ZERO FOR 108 GRADUATES

	Scholarship	Entrance Units of Latin	Rank in Quartiles	Army Alpha	Terman	Army Alpha and Terman	Sum of Four Factors
1. Practice Teaching	.431	—.002	.082	.0925	.1267	.1207	.1135
Practice Teaching and Scholarship		.009	.260	.283	.296	.320	.353
2. Scholarship		.1667	.382	.412	.396	.447	.517
Entrance Units in Latin			.2746	.172	.068	.135	
Rank in High School by Quartiles				.182	.058	.135	
Army Alpha					.633		

The following formula[1] is used to calculate the probable error:

The equation is:

$$\text{P. E.} = \frac{\pm .6745\ (1\text{-}r^2)}{\sqrt{N}}$$

Scholarship.

In Table 22 the highest r is .655 between Persistence in School and Scholarship, which is, of course, to be expected. The r between Scholarship and Quartiles is .478 which agrees with the high relationship between Scholarship in college and rank in a secondary school which was found in the preceding chapter. The r between Scholarship and Terman is .353, between Scholarship and Army Alpha .342, between Scholarship and Army Alpha Combined with Terman, .382. The r between Scholarship and Quartiles is .478, which is almost as large as the r between all factors combined which is .525. It would seem almost as reliable to know the Quartile rank of a student at entrance as it is to know his ranking in the four factors, i. e., Entrance Units of Latin, Quartiles, Army Alpha and Terman. Evidently the other three do not add much to Quartiles as far as predicting Scholarship is concerned.

The factors rank: Quartiles, Army Alpha, Terman and Latin which agrees with the findings in Chapter 5, with the exception that Terman and Army Alpha are reversed.

Persistence in School.

The third criterion, Persistence in School, ranks high with Scholarship as before indicated; next with Quartiles, .333, and third with Terman, .163; fourth, with Latin Entrance Units, .152, and lastly, Army Alpha, .091. The significant thing here is that Persistence in School is conditioned slightly by intelligence factors. This agrees with the findings in Chapter 5, except that Latin Units at Entrance and Terman are reversed.

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[1]Garrett, H. E.: Statistics in Psychology and Education, (Formula 26), 170.

Practice Teaching.

Table 23 shows the criterion, Practice Teaching, in relation to other factors. The r between Practice Teaching and Scholarship in college is the highest single correlation, .431, but Practice Teaching with the variable, Entrance Units of Latin, is -.002, practically nothing, with Quartiles only a little better, .082, and Army Alpha .0925, and with Terman the highest, a little better than .1, or .1267. That Terman should hold first place is possibly due to chance. The correlations are all too low to be significant, but are exactly in the same rank as found in Chapter 5. This low relationship will show later in the multiple and partial correlations. Evidently the chances for predicting on these factors at entrance are indeed nil.

Since there is a fair correlation between Scholarship and Practice Teaching (.431) and since the four factors correlate fairly high with scholarship, (.525) and very poorly with Practice Teaching (.113), there must be a factor common to both Scholarship and Practice Teaching, which is not included in these four factors. This factor might be personality.

Table 24 gives the intercorrelations of the order zero as worked out by Whitney in the "Prediction of Teaching Success."

TABLE 24

INTERCORRELATIONS OF ORDER ZERO AMONG TRAITS IN TWELVE STATE NORMAL SCHOOLS[1]

r between teaching success after graduation and intelligence	.025
r between teaching success after graduation and secondary record	.091
r between teaching success after graduation and academic marks	.073
r between teaching success after graduation and professional marks	.143
r between teaching success after graduation and student teaching	.238

[1]Adapted from Whitney, Prediction of Teaching Success, Table 1V, p. 20.

r between	intelligence	and	secondary record	. . . . .	.355
"	"	"	" academic marks	. . . . .	.343
"	"	"	" professional marks	. . . . .	.327
"	"	"	" student teaching	. . . . .	.160
"	"	secondary record	and academic marks	. . . . .	.355
"	"	"	" " professional marks	. . .	.355
"	"	academic marks	and professional marks	. . . .	.484
"	"	"	" " student teaching	. . . . .	.386
"	"	professional marks	and student teaching	. . . .	.270

The reader will observe that the correlations of the order zero correspond well with Whitney's data. The low correlation between teaching success and intelligence and the higher correlations between intelligence and scholarship and between secondary record or Quartiles and professional and academic marks, or scholarship, compares very favorably with the correlations found in this study.

Evidently there is some factor missing. Some other factor has to be included if one can make a prediction for practice teaching. Sommers had teachers in a normal school rate students on a five point scale. Each student was rated on the following traits: (1) tact; (2) personal appearance; (3) optimism; (4) sincerity; (5) scholarship; (6) sympathy, and (7) industry. Each trait was then weighed by experienced schoolmen as follows: 3 each to intelligence, industry and scholarship; 2 each to sympathy, sincerity and tact, and 1 to optimism and personal appearance. These were all averaged and a composite score computed. Table 25 shows Sommers'[1] correlation between his personality traits and other factors similar to the ones used in this study.

TABLE 25

INTERCORRELATION BETWEEN TRAITS ACCORDING TO SOMMERS

The r between Personality and first semester marks	.720
Between Personality and first year marks	.749
Between Personality and two-year marks	.762

[1]Sommers, G. T.: Pedagogical Prognosis, (Table XII), 52.

Between personality and teaching in training school, i. e., Practice Teaching ..... .608
Between Personality and teaching in the field ..... .615

From inspection of the table it is readily seen that personality correlates high with scholarship and teaching ability. His correlations between intelligence tests and scholarship, and intelligence tests and teaching are low, and compare favorably with the correlation shown in this study.

Part IV.

Partial and Multiple Correlations and the Regression Equation

It may be said in a general way that: first, a correlation of the order zero shows the crude relationship which exists between one variable and a criterion. Second, a partial correlation shows the independent relationship of one variable to a criterion when the relationships of other variables with the first variables are held constant. Third, a multiple correlation shows the sum total of all such independent relationships with the criterion.

Partial correlation helps to put content and meaning into relationship between factors, and is expressed by the formula[1]

$$r\ 12.3 = \frac{r12 - r13 \times r23}{\sqrt{1 - r^2 13}\ \sqrt{1 - r^2 23}}$$

Table 26

Practice Teaching

Multiple Correlation

$$rP\ (L\ Q\ A\ T) = .151$$

Regression Equation

$$PT = -.031\ L + .086\ Q + .007\ A + .114\ T + 8.25$$

[1]Garrett, H. E.: Statistics in Psychology and Education, 249.

Significant Partial Correlations

1 r PT . LQ = .124
2 r PA . LQ = .083
3 r PQ . LAT = .079
4 r PL . QAT = —.033

The letters in the regression equation stand for Standard Deviation values.

Table 27

Scholarship

Multiple Correlation

r S (L Q A T) = .577

Regression Equation

Sch. = .036 L + .430 Q + .153 A + .197 T + 1.923

Significant Partial Correlations

1 r SQ . LAT = .447
2 r ST . LQ = .334
3 r SA . LQ = .317
4 r SL . AT = .164
5 r SL . QAT = .041

These are significant equations. Others may be seen in the Appendix.

Where r is the relationship between any two variables with the third kept constant.[1]

For example, in Table 26 the following relationships between the criterion, Practice Teaching, and each of the variables are as follows:

The correlation between Practice Teaching and Terman Intelligence Tests with Entrance Units of Latin and Quartile Ranks in high school kept constant is positive and to the

[1]Relationship expressed by two variables is called the order zero as r 12; if, however, one of three variables is to be counted out or kept constant, a point is inserted, as r12.3. This is called the first order. If two variables are to be counted out, as r12.34, this is called the correlation of the second order and a point is inserted between two and three. The order of correlation is shown by the number of digits to the right of the point.

degree expressed by the ratio .124. The correlation between Practice Teaching and Army Alpha test with Entrance Units of Latin and Quartile Rank in a secondary school kept constant is positive and expressed by the ratio .083, and so forth.

It is evident that the variables each in their turn add little to the criterion Practice Teaching, for the correlations are so low as to be almost negligible.

The multiple correlation where the criterion Practice Teaching is related to Latin, Quartiles, Army Alpha and Terman, is only .151.[1]

The correlation between Practice Teaching and the above variables is so low as to suggest that there is hardly any correlation at all. Evidently some factor that would correlate high with the variables and high with Practice Teaching is left out. According to Sommers' study already referred to, that factor may be what he calls Personality—as the correlations without this factor compare favorably with the same factors that are found in his study.

Since there is so little correlation between Practice Teaching and the variables as a group, there can be little or no prediction based on these factors at entrance as to the probable Practice Teaching mark of a student. The regression equation confirms this. The equation is:

$$P\ T = -.031\ L + .086\ Q + .007\ A + .114\ T + 8.25^{2} + 8.25$$

If Standard Deviation scores be substituted for the variables and multiplied by the weights assigned plus the constant 8.25 (which is almost at the mean for the group), the results would always be about 10, which is the average Standard Deviation score for the group. According to this equation, every student, irrespective of his score on any of the variables at entrance would get G in Practice Teaching. This would be the best guess, but for predictive purposes it would amount to nothing, as only 31 percent of the class received that particular grade.

[1]See Garaett, (Formula 56), 238.

[2]L—Entrance Units of Latin; Q—Quartile rank in high school; A—Army Alpha score; T—Terman score.

Inspection of Table 27 reveals the four factors as having some predictive value for Scholarship, as contrasted with the four factors and Practice Teaching. The multiple correlation of all variables with Scholarship is .577.

The partial correlations are also much higher. The r between Scholarship and Quartiles with Latin, Army Alpha and Terman constant is .447, the highest, and so forth.

In this connection it is interesting to note the added values that partial correlations have. It will be seen that from Table 22 the r between Scholarship and Entrance Units of Latin is .226. But when the technique of partial correlation is used, the r for Scholarship with Army Alpha and Terman kept constant becomes .164. When the Quartiles are partialed out the r equals .041. In studying the effect of Latin on Scholarship in the School of Education, it is evident that intelligence should be partialed out, leaving the correlation .164. Whether the Quartiles should be partialed out is another question, as it is not known whether the student's scholarship affects his choice of Latin, or whether the study of Latin affects his scholarship. However, even if the Quartile rank is partialed out and the correlation reduced to .041, it can still be said that those with more units of Latin do better in college even if this better performance is not ultimately due to Latin itself.

The regression equation becomes then,

$$\text{Scholarship} = .036\ L + .430\ Q + .153\ A + .197\ T + 1.923$$

That is, any personnel officer with this equation and the Standard Deviation scores can predict to a certain extent the scholarship of a student at entrance.

However, since Quartiles are always available at entrance, and Terman frequently so, and since the other two variables add little to the combination, the Quartile rank in high school and Terman group test score may be more conveniently used to predict scholarship. The regression equation with those two factors then becomes:

$$X_1 = {}^{b}12.3X_2 + {}^{b}13.2X_3 + K.^{1}$$

Substituting, and working out the equation, Scholarship $= 1.53\ (5—Q) + .0425T — 2.61$. That is, with this equation at admittance, it is possible with raw scores to predict

[1]See Garrett (Formula 52), 242.

the average scholarship of a student from his Quartile rank in high school and Terman group test.

In order still further to facilitate the prediction, Table 28 has been worked out for every possible Terman score and Quartile rank. On the left are the Terman scores; on the top, the Quartiles.

TABLE 28

Showing the Average Scholarship Grade in the School of Education Expected from Quartile Rank in High School and Terman Group Test at Entrance.[1]

Terman Group Test Scores	1st quartile rank	2nd quartile rank	3rd quartile rank	4th quartile rank
200-210	G or G+	G	G—	P+
190-199	G	G—	G—	P+
180-189	G	G—	P+	P+
170-179	G	G—	P+	P
160-169	G	G—	P+	P
150-159	G—	G—	P+	P—
140-149	G—	P+	P	N+
130-139	G—	P+	P	N+
120-129	G—	P+	P—	N
110-119	G—	P+	P—	N—
100-109	P+	P	N+	F+
90- 99	P+	P	N+	F+
80- 89	P+	P—	N	F+
70- 79	P	P—	N—	F+

Table reads as follows:

A student offering a Terman score from 200 to 210 and graduating from the 1st quartile of his class will get an average of G or G + in scholarship, etc.

The highest possible prediction is barely a G+ for the highest score on the Terman and the 1st Quartile. The P. E. is 1.670 Standard Deviation Scores, which for most parts of the scale is a little less than the difference between two grades, that is, G and G+.

[1]Sch. = 1.53 (5 — Q) + .0425T — 2.61.
In substituting in this equation, use the raw values of the Quartiles and Terman Scores.

Summary

The contents of this chapter may be summed up as follows:

1. The correlations of the order zero constitute a valuable check, in that they, with one or two minor exceptions, check exactly with the findings of the percent method.

2. Partial correlations are valuable as checks on the percent method as shown by the fact that in the percent method there were some relationships between Latin Units and the criteria which in the partial correlations were partialed out.

3. The multiple correlation on the basis of these four factors show that there is some prediction possible for Scholarship but none for Practice Teaching.

4. The regression equation for Quartile rank and Terman scores is of some value in predicting Scholarship but the regression equation for Practice Teaching is useless.

CHAPTER VII.

FOLLOW-UP STUDY OF THE CLASS BY MEANS OF QUESTIONNAIRES[1]

Part I.

Analysis of Class

In order to get a picture of the class at work in the field, a questionnaire was devised to find out the following facts:

1. Teaching or not teaching.
2. Name and grade of subjects taught.
3. Number of classes taught.
4. Extra-curricular activities sponsored.
5. Professional courses that have been of the most benefit.
6. Reasons for thinking so.
7. Certificate held.
8. If not teaching, in what work engaged, and in what respect the courses in the School of Education were of help in this work.

Of the replies received from the 108 graduates, thirty-five were teaching, fifteen were not.

Table 29 gives the tabulated answers to these questions.

From an inspection of the table, twenty-four students are actually teaching their major subjects, six are teaching subjects for which they have had somewhat less preparation, and five very little, if any. The large proportion teaching their major subjects answers the question: Are graduates teaching what they were prepared to teach as far as subject matter is concerned?

The number of students that are sponsoring extra-curricular activities is few; however, this might be explained by the hesitancy of superintendents delegating extra-curricular activities to teachers who are novices.

Practically all of the class subscribe to Practice Teaching and Observation as being the most practical benefit. This

[1]See Appendix for Questionnaire.

TABLE 29

ANALYSIS OF GRADUATES

THOSE WHO ARE TEACHING

Name and Grade of Subjects Taught	Classes per Day in Each Subject	Extra-Curricular Activities Sponsored	Professional Courses That Have Been of Most Benefit	Reasons for Thinking So	Certificate Held	Major in School of Education
2. Arithmetic, drawing and hygiene	3		Psychology Vocational courses		Pa. College Provisional	History
3. Mathematics	6	Dramatics	Practice Teaching Methods of Teaching Mathematics Analysis of Teaching	Practical benefit		Mathematics
4. English and Mathematics	4	Magazine Club	Practice Teaching Analysis of Instruction Psychology School Administration	Practical benefit	New Jersey and Penna.	English
5. History	5½	Debating Senior Class Advisor	Practice Teaching Methods in History Psychology	Practical benefit	New Jersey	History
6. History Geography English	5		Psychology and all Education courses	Practical benefit	New Jersey	History

Name and Grade of Subjects Taught	Classes per Day in Each Subject	Extra-Curricular Activities Sponsored	Professional Courses That Have Been of Most Benefit	Reasons for Thinking So	Certificate Held	Major in School of Education
7. Mathematics Bus. Training Etomology	4		Methods in Mathematics Hist. of Ed. Practices Practice Teaching Analysis of Instruction	Practical benefit	Penna.	Mathematics
8. Latin			Observation and Practice Teaching	Practical benefit		Latin
9. Physical Education and Health	9	Girls' Basket Ball	Physical Education Health and Hygiene	Practical benefit		English
10. Mathematics	3		Practice teaching	Practical benefit	Penna.	Mathematics
11. History	5		Observation Practice Teaching	Practical benefit	Penna.	History
12. 3d and 4th grade					Penna.	Psychology
13. Mathematics	3		Practice Teaching		Penna.	Mathematics
14. English and Social Studies	6	Athletics Girls' Reserve	Secondary Ed. Administration Vocational Ed. Hist. of Ed. Practice Teaching	Practical benefit	Penna.	English

Name and Grade of Subjects Taught	Classes per Day in Each Subject	Extra-Curricular Activities Sponsored	Professional Courses That Have Been of Most Benefit	Reasons for Thinking So	Certificate Held	Major in School of Education
15. Social Studies Geography Hygiene	5½	Athletics	Practice Teaching Observation Analysis of Teaching Psychology 1-4			English
16. 1st Grade			Vocational Ed. Elementary Ed. Psychology	Practical benefit	Penna.	Psychology
17. Stenography	4 (Teaching	at night—study	Analyis of Ed. ing law during the day	Practical time)		Psychology
18. English History Geography	8		Practice Teaching	Practical	Penna.	Psychology
19. English	5	Holiday assemblies	Educational Psychology Courses in Ed.	Interpret school in terms of Phil. of Education	Penna.	English
20. Substitute work			Practice Teaching Observation	Practical	Penna. Col. Prov.	
21. Junior High School Mathematics	5		Practice Teaching Observation	Practical	Penna.	Mathematics
22. Freshman Algebra	5				Penna.	Mathematics

Name and Grade of Subjects Taught	Classes per Day in Each Subject	Extra-Curricular Activities Sponsored	Professional Courses That Have Been of Most Benefit	Reasons for Thinking So	Certificate Held	Major in School of Education
23. Arithmetic and Hygiene	3	(Teaching in McCall Continuation)			Not given	English
24. History, Civics and English	6		Practice Teaching Observation Administration Analysis of Ed.	Practical	Penna.	English and Mathematics
25. 6th Grade (Retarded)	All Subjects		Psychology and Methods of Teaching	Practical	Temp. College Certificate	Mathematics
26. Latin	5	Latin Club	Observation Practice Teaching	Practical	Temp. College	Latin
26. Latin and American History	4–1		Observation Practice Teaching			
27. Latin	5		Observation Practice Teaching	Practical	Del. and Penna.	Latin
28. Arithmetic	5	Handicraft	School Administration Secondary Education Practice Teaching Observation		Penna. and New Jersey	Botany

Name and Grade of Subjects Taught	Classes per Day in Each Subject	Extra-Curricular Activities Sponsored	Professional Courses That Have Been of Most Benefit	Reasons for Thinking So	Certificate Held	Major in School of Education
29. English Arithmetic Music	2 2 2	Health Exhibit Musical	Practice Teaching Administration Vocational Education	Developed a professional attitude	New Jersey	History
30. French Spanish English Algebra Geometry History and Civics Spelling	9 classes per day (Brown Prep. School)		Ed. 52, Ed. 51 Psy. 29 Practice Teaching Observation Psychology	Practical	Penna.	French
31. English	4½		Eng. Comp. and Literature	A good background	College Prov. Penna.	Not given
32. History Civics	5		Practice Teaching Observation	Practical	New Jersey	History
33. History Reading Appreciation	6		Methods Observation Practice Teaching	Practical	Penna.	English
34. Art English	4½ (Substitute Work)		Hist. of Ed. Sec. Ed.	Gen. Know.	Penna.	English
35. Science in Jr. High School	5	Advisor of 8th grade	Observation Practice Teaching	Practical	Penna.	Chemistry

fact is also shown conclusively in Whitney's Study. Other educational courses as Method, Administration, Secondary Education, Vocational Education and Psychology are frequently mentioned. Most of the graduates are teaching in Pennsylvania, and hold College provisional certificates.

Part II.

Analysis of Graduates by Questionnaire

Table 30 shows the tabulation of fifteen students who are not teaching. No conclusions can be reached concerning their occupations, as they are so widely scattered. No two students were engaged in the same work. All seem to think that the courses in college are of general value; no specific courses were cited as particularly valuable. More than half preferred other work than that of teaching; a few could not get a position or could not get position desired.

Summary

Even in the few cases reporting one can see certain definite tendencies, namely:

1. That graduates are teaching subjects for which they were prepared to teach.
2. That they are not excessively loaded with many and different kinds of classes.
3. That most of them are teaching in secondary schools.
4. That Practice Teaching and Observation are the most practical and beneficial of all the courses, as judged by questionnaires.

Part III.

Causes for Dropping out of the School of Education

As shown by Chart 4, the reason why forty-one of the students failed to graduate cannot altogether be charged up to lack of ability—as measured by the Army Alpha and Terman scores. There must be other causes that aid in explaining why nearly one-third of the class failed to graduate.

In an endeavor to find out these causes, a letter and questionnaire[1] were sent to the forty-one students. Each was asked

[1]See Appendix for copy of Questionnaire.

TABLE 30

ANALYSIS OF GRADUATES BY QUESTIONNAIRE

THOSE WHO GRADUATED BUT ARE NOT TEACHING

Student No.	I In What Work Are You Now Engaged	II Specific Ways in Which School of Education Has Helped You in Your Work	III Why Did You Not Enter Teaching Profession?
1	Proof reading	Sometimes writes stories. Have had help in general way.	Preferred other work.
2	Attending Business	No present benefit; hopes to benefit in future.	Could not get a position.
3	Telegraphy	None	Candidate for position
4	Library work	Very helpful	Preferred other work
5	Substituting		Waiting for a permanent position
6	Laboratory work	Ways too numerous to mention	Could not get a position
7	Social Service Work	General knowledge of sociology and psychology	Preferred other work

THOSE WHO GRADUATED BUT ARE NOT TEACHING

Student No.	I In What Work Are You Now Engaged	II Specific Ways in Which School of Education Has Helped You in Your Work	III Why Did You Not Enter Teaching Profession?
8	Graduate work	A good basis for graduate work	Preferred other work
9	Secretary	Education and mathematics courses	Preferred other work. Salary not sufficient
10	Doing nothing		Just graduated. Has not a position
11	Married		Preferred other work
12	Psychologist in Municipal Court	General Courses in Psychology, Sociology and Education	Preferred other work
13	Y. W. C. A.	Makes daily use of knowledge gained in courses	Preferred other work
14	Married		
15	Living at home		Could not get a position

to check the primary and secondary reasons from an assumed list of twenty-five probable reasons, and then to list on the back of the blank additional ones not included in the questionnaire. Spaces also were provided for listing subjects that were difficult and subjects that were easy; for the extra-curricular activities, and the amount of time spent in outside work to help defray expenses.

Thirty replies were received. No names appeared on the blanks; the replies were to be considered confidential. The questionnaires were, in most instances, answered completely and conscientiously—many students supplemented the questions by additional information of a personal nature. One has every reason to believe that the answers were a true indication of the attitude of the student.

Following are the questions marked with a circle to indicate that the cause was a primary one. The questions are in rank order according to the frequency of answers.

Frequency	*Reasons given for Dropping Out*
8	Poor health.
5	a. Transferred to other colleges.
	b. Economic reverses in the family.
3	a. Too many outside social engagements.
	b. Did not get to join the social group preferred, i. e., fraternity.
	c. Dropped out on account of poor marks.
	d. Decided to get married.
2	a. Lack of interest in work.
	b. Did not like spirit of school.
	c. Did not wish to become a teacher.
	d. Difficulty of a disciplinary nature with teachers.
1	a. Death in the family.
	b. Family not in sympathy with continuance in school.
	c. Subject matter and courses too difficult.
	d. Did not understand how to study.
	e. Transferred to another department.

f. Had to borrow too heavily; did not wish to go in debt so deeply.

The Secondary Causes listed in the same way are:

Frequency	*Reasons given as Secondary Cause for Dropping Out*
5	a. Did not understand how to study.
	b. Lack of interest in subjects.
4	a. Too much time given to outside activities.
3	a. Too much time given to extra-curricular activities.
2	a. Family not in sympathy with continuance in school.
	b. Had to borrow too heavily to stay in school.
	c. Subjects and courses too difficult.
	d. Dropped out on account of poor marks.
	e. Economic and financial reverses in family.
	f. Failed to establish friendly, co-operative relationship with instructors.
	g. Did not wish to become a teacher.
1	a. General poor health.
	b. Death in the family.
	c. Was not happy—social relationships with classmates.
	d. Wished to transfer to another college.
	e. Could see no value in remaining in school.
	f. Did not like the spirit of the school.

Of the primary reasons given for dropping out, "Poor health" has the most frequencies. The importance of this factor is recognized by Whitney, since he includes it in the seven items or factors for study. He suggests that Health Record,[1] Secondary Record and Intelligence at entrance to the training school are the most important factors for predictive value and writes the regression equation for these three factors.

The second reason, "Transferred to other schools," implies that though students were "excluded on account of poor

[1]Whitney, F. L.: Prediction of Teaching Success, p. 45.

scholarship," they evidently wished to continue their education in another institution. Only one of the group reported that she had a teaching position.

"Economic and financial reverses of the family" in a few individual cases cause students to drop out; this might be taken care of by student loan funds and scholarships.

The other primary causes are important for consideration, but they are too scattering to make any practical deductions.

In the secondary causes those of greatest frequency are: (1) "Lack of interest." Evidently those students were not interested in professional education, and are better off outside than in. The next two items, "Did not understand how to study," and "Too much time spent in outside social engagements," indicate a guidance problem; that is, of instructing students in some manner regarding the importance of budgeting their time, and using it to the best possible advantage. Teaching pupils how to study is receiving much attention from Personnel Officers and Psychologists at the present time, judged by the literature on the subject. Orientation courses, freshman week and class room instruction supplemented by a handbook or various texts devised for the purpose is becoming a part of the guidance program in colleges and universities.

The subjects listed by those that dropped out are as follows:

Subjects that were difficult

Frequency	*Subject*
5	a. Zoology
	b. Mathematics
	c. History
4	a. Botany
3	a. Education
	b. French
	c. Spanish
	d. Psychology
1	a. Biology
	b. Sociology
	c. Astronomy
	d. Greek
	e. Music

Subjects that were easy:

Frequency	*Subject*
12	a. English
4	a. History
	b. French
	c. Mathematics
3	a. Education
	b. Hygiene
2	a. Latin
	b. German
1	a. Chemistry
	b. Sociology
	c. Psychology
	d. Zoology
	e. Spanish

From an inspection of the lists, English seems to be by far the easiest subject, while the sciences are the most difficult. History seems to be nearly as easy for some as it is difficult for others. These lists agree in a general way with the results of Chapter V on selection of subject matter demonstrated by majors.

Only eight students out of the thirty reported extra-curricular activities in which they were engaged. The frequency of each was as follows:

Fraternities	4 students
Clubs of various kinds	3 students
Athletics	3 students
Class organizations	3 students
Y. W. C. A.	2 students
Glee Club	2 students
Community Center	1 student

Two students reported that they were working four hours per day each, and one student four hours per week.

Evidently extra-curricular activities and outside work to pay expenses are not fundamental causes for dropping out. There were a few cases where family financial difficulties acted as a contributory cause. Presumably a student would prefer

to quit school than borrow heavily or do outside work; since the students were girls, this is not unusual.

In summing up the chief reasons as revealed by student answers, we find:

1. Poor health.
2. Lack of professional interest.
3. Inability to get oriented both scholastically and socially to the group and life of the school.

CONCLUSIONS AND RECOMMENDATIONS

Following are the conclusions based on the class studied and their application to the guidance program. These are considered from three points of view, namely, Admittance to the School of Education, Guidance while in School, and Placement.

I. Guidance and Admittance

What is the best basis for admitting students when Persistence in School is the chief criterion? For determining the Persistence in the School of Education a knowledge of the Quartile rank of the student from his secondary school is best, since only one-half the normal proportion in the first Quartile drop out and three times the normal drop out from the fourth Quartile. Students from the first, second and third Quartile ranks are acceptable, but a student from the fourth Quartile is a doubtful risk, and probably should not be admitted. Therefore, the knowledge of the Quartile rank of a candidate from a secondary school enables those responsible for admissions to select more intelligently individuals who would remain in school until graduation.

The lower scores of students as measured by the Army Alpha and Terman Group Tests are not poor risks unless their low score be combined with a low Quartile rank from a secondary school. This would indicate that a group intelligence score alone is not a safe criterion for admitting students. Quartile rank is the best single basis for determining persistence in school according to this study.

II. Guidance while in the school of education

Prediction of Scholarship.

Quartiles again play the most important role in predicting poor scholarship, while for predicting "D" scholarship, Terman scores are best. In other words, a student with a low Intellgience Score may make a passing mark in Scholarship, but in order to make a "D" in scholarship the student must have had a high Intelligence Score. Table 28 shows the most probable average scholarship mark that a student will make in the School of Education from a given Terman Score and Quartile rank from a secondary school. This table will be of benefit to a personnel officer as an aid to guidance in the following ways:

1. This table can be used as a yard stick for measuring similar groups, since it shows the actual scholastic rating of one group, though small, based on a Terman group test and Quartile rank at entrance.

2. Those of low Quartile rank and relatively high Intelligence scores need investigating, as they are not doing their best work.

3. Those who are high in Quartile rank but low in Intelligence scores may be hard workers and need guidance in the choice of subject matter, conservation of health, and outside activities.

4. Since Terman Scores predict "D" scholarship better than Quartiles, those students with high scores should at once be singled out as possible research students, acting as aids to instructors, with opportunity given them to develop their creative talents. It is in the selection of "D" students that high Terman scores are of greatest benefit; otherwise, they are of no value unless related to the Quartile rank.

Prediction of Practice Teaching.

Each of the factors bears a positive relation to this criterion and roughly the same as to scholarship. That is, those who ranked highest in the four factors considered at entrance also ranked highest in Practice Teaching, though there is little difference between the average Practice Teaching grade of those

who graduated from the first Quartile of a secondary school and those who were in the second and third. Indeed, this difference was so slight that almost no prediction could be made in terms of the regression equation. Evidently Practice Teaching is so bound up with the intangible factors of personality that without some personality rating no prediction can be made.

Choice of majors

The study presents some evidence, confirmed by other studies, to show that students with high intelligence scores select certain types of subject matter, or that subject matter tends to select students of varying abilities. This is shown by the higher scores made on the Army Alpha and Terman by students who offered four years of Latin as against those who offered none. It is also shown by the average scores of those majoring in different subjects. The foreign language, mathematics and science majors made better scores on the two intelligence tests than did the groups majoring in history and English. English showed the widest variation in composite scores of any of the majors. This might be explained by the fact that while English does select the highest in ability, it also offers an avenue to graduation for the less endowed. A student can major in English when he would be less likely to fulfill the requirements of a major in such subjects as Latin or mathematics.

In advising students to major in various subjects, the intelligence scores with other factors should be taken into consideration. Since students majoring in chemistry, physics, mathematics and foreign languages have relatively high scores students with low scores would have difficulty in competing with them and would be more successful scholastically if they majored in subjects more commensurate with their abilities.

Adaptation of Methods of Instruction

As measured by the Army Alpha, the School of Education is drawing to its doors a highly selected group, ranking higher than the normal school groups and on a par with best university and college groups of the country. The knowledge

of this fact should aid in adapting methods of instruction and subject matter to the needs and capacities of these students. The quality and quantity of work demanded by instructors should depend upon the intellectual and intelligence level of the group; therefore, it is highly important to know the standing of a given group in comparison to other groups in colleges and universities.

Reasons for dropping out

As far as this study is concerned, there is little evidence to show that persistence in school is conditioned by intelligence alone. Most of those who dropped out were "excluded" on account of poor scholarship. This "poor scholarship" was evidently in many cases an incident and not a cause. If the questionnaires answered by those who dropped out reveal accurate information, the problems of health and adjustment or orientation are important for guidance purposes. The problem of health is so important to the success of a teacher that perhaps it should be considered from a selective point of view at entrance and certainly from a promoting and conserving point of view throughout the course until graduation. Required courses in physical education, hygiene and related courses should aid in promoting and supplementing the bodily vigor of the students.

From the data offered by the questionnaires in this study, there seems to be a definite need for orienting students scholastically and socially to the group and life of the school. Judged by the literature on the subject, teaching students how to study is receiving much attention from personnel officers at the present time. Orientation courses, Freshman Week, class room instruction, supplemented by a handbook or various texts on the subject, are becoming a part of the guidance program in colleges and universities. The class period given over by the instructor occasionally in showing students how to study and how to organize material accompanied by instruction in the psychological basis of the learning process would do much toward giving a student a scholarly attitude and a technique for reflective thinking.

A few cases in the study suggested financial reverses in the family as a reason for dropping out. This might be taken care of by student loan funds and scholarships.

Subjects Considered by Students to be Most Valuable.

The professional subjects considered to be the most valuable to teachers were Observation and Practice Teaching. This indicates that every facility for Practice Teaching and Observation should be given. There is need for actual teaching experience to be provided under as nearly normal conditions as possible, whether by co-operation with the city system or practice school, or both.

Not all those who enter the School of Education are expecting to teach. Whether the School of Education should install special courses for training in social service and other occupations closely related to educational work that graduates enter cannot be answered from the data given.

III. Guidance and Placement

There is little correlation (.1+) found between the practice teaching mark given in the School of Education and marks given to these same people by Superintendents after two years of teaching experience. Evidently there are different methods of judging teaching, based upon the different standards used. Further studies should be made on more objective as well as subjective methods for judging teaching.

There is no evidence to indicate qualitatively the mark in scholarship or the intelligence score that is necessary for success in teaching. Granting that the intelligence score, practice teaching and scholarship marks are qualitatively sufficient to insure graduation from the School of Education, then it would seem that those responsible for guidance at this point would have to study the placement problem of any individual in terms of personality factors demanded by that particular position. Guidance would be aided by a study of so-called teaching personality factors.

Most of those who wished to teach were able to get positions, though a number were engaged in other occupations,

because they did not get the kind of position, with respect to salary and location, they desired.

IV. Further Studies Needed

This study will have made a contribution if through its method and organization, it encourages the undertaking of further studies involving more facts and cases which may confirm or reject the tendencies found in this study.

There is at the present time a better opportunity for securing and compiling data on a sufficiently large group. The psychological tests given by the College, the College Aptitude tests, the Personality ratings, the more elaborate secondary ratings that high schools are beginning to develop, will insure the future investigator a wealth of material. If this is supplemented by follow-up record in the field, then can reliable answers to the questions raised in this study be given.

That some method should be devised to study personality and particularly that type of personality which might be called teaching personality, is evident.

If an intelligent selection and study of factors that influence teaching success is to be made, full and adequate records of all personality and character traits on which a judgment is possible in the high school and college is necessary. These records should be checked up by the criterion, Teaching Success, after graduation.

The method used in this study and others cited by the writer will prove helpful in treating these facts.

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2. Natural aptitude for work.
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4. Interest and industry.
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APPENDIX

STANDARD DEVIATION SCORES IN MAJORS

108 GRADUATES

Major	Pupil Number	Entrance Units of Latin	Quartiles	Army Alpha	Terman	Scholarship	Practice Teaching
Latin							
	1	6	12	14	13	18	14
	2	13	12	12	12	15	13
	3	13	9	9	10	10	13
	4	11	12	14	13	12	13
	5	13	12	10	12	12	11
	6	13	12	11	10	12	11
	7	13	12	13	12	14	8
	8	13	12	6	3	10	9
	9	13	12	7	8	12	9
	10	13	12	15	12	12	11
	11	13	12	14	13	9	9
	12	13	12	12	11	10	8
		12.2	11.7	11.4	10.7	12.2	10.7

Major	Pupil Number	Entrance Units of Latin	Quartiles	Army Alpha	Terman	Scholarship	Practice Teaching
Chemistry							
	1	11	9	10	10	9	13
	2	11	12	11	8	13	14
	3	13	9	15	14	12	8
		11.6	10.	12.	10.6	11.3	11.3
French							
	1	13	12	11	14	14	11
	2	11	12	13	10	15	9
	3	13	12	14	13	9	9
	4	13	5	9	12	9	11
	5	13	12	14	13	15	9
	6	6	5	9	11	10	9
		10.9	9.6	11.6	12.1	12.0	9.7
Psychology							
	1	11	12	13	12	15	14
	2	13	12	11	12	9	14
	3	13	12	10	10	13	14
	4	13	12	14	14	10	9
	5	6	5	9	10	8	11

Major	Pupil Number	Entrance Units of Latin	Quartiles	Army Alpha	Terman	Scholarship	Practice Teaching
Psychology (Con.)	6	6	12	7	12	12	9
	7	9	9	7	11	9	11
	8	13	12	10	12	7	4
	9	13	12	12	15	11	6
		10.8	10.9	10.3	12.	10.4	10.2
Mathematics							
	1	6	12	15	14	14	14
	2	13	12	13	13	16	14
	3	13	9	13	12	15	13
	4	13	12	12	13	13	13
	5	13	12	7	11	15	14
	6	9	12	11	13	16	13
	7	13	12	11	13	14	11
	8	6	12	13	12	9	9
	9	12	12	13	15	12	9
	10	13	12	9	11	12	11
	11	6	9	9	8	11	13
	12	13	12	12	10	11	11
	13	9	12	3	3	8	9
	14	6	6	9	7	8	9

Major	Pupil Number	Entrance Units of Latin	Quartiles	Army Alpha	Terman	Scholarship	Practice Teaching
Mathematics (Con.)	15	13	12	8	11	11	9
	16	6	12	12	12	13	8
	17	6	9	12	13	10	8
		10.	11.1	10.7	11.8	12.8	11.1
Botany							
	1	6	12	12	10	9	6
	2	13	12	10	6	12	8
	3	6	12	12	14	15	13
		8.	12.	11.	10.	12.	9.
English							
	1	13	12	15	14	14	14
	2	13	12	14	11	9	14
	3	11	5	13	12	10	14
	4	13	12	13	14	14	13
	5	6	5	10	6	9	14
	6	13	9	9	12	17	14
	7	11	12	11	13	10	9
	8	6	12	11	12	9	9
	9	13	12	11	1	10	9

Major	Pupil Number	Entrance Units of Latin	Quartiles	Army Alpha	Terman	Scholarship	Practice Teaching
English (Con.)	10	6	12	13	12	13	9
	11	6	9	8	11	10	13
	12	13	9	9	9	10	11
	13	13	9	9	9	13	9
	14	13	12	10	11	12	11
	15	6	12	4	6	7	11
	16	13	5	2	2	7	8
	17	6	12	7	6	10	11
	18	13	12	6	11	11	8
	19	8	9	7	9	11	9
	20	7	9	8	12	8	9
	21	13	5	8	10	9	9
	22	13	12	11	9	11	9
	23	11	5	11	10	11	11
	24	6	2	12	12	10	13
	25	13	12	12	14	12	8
	26	12	12	12	11	12	9
	27	10	5	7	9	8	8
	28	6	9	4	4	8	8
	29	11	12	4	7	8	6
	30	11	12	9	7	10	4

Major	Pupil Number	Entrance Units of Latin	Quartiles	Army Alpha	Terman	Scholarship	Practice Teaching
English (Cont.)	31	13	12	9	10	10	4
	32	13	5	10	12	10	4
	33	9	5	15	13	12	6
	34	9	12	14	10	11	6
	35	13	9	14	14	11	4
	36	13	12	15	13	13	13
		10.5	9.5	9.9	9.9	10.5	9.4
History							
	1	13	12	10	9	11	14
	2	6	12	9	12	15	14
	3	13	12	10	7	12	11
	4	7	5	10	13	9	9
	5	6	9	10	11	9	11
	6	13	12	12	11	9	8
	7	13	12	14	12	14	11
	8	6	9	10	10	12	9
	9	8.9	12	3	4	9	11
	10	13	9	4	8	10	11
	11	13	12	6	7	11	9

Major	Pupil Number	Entrance Units of Latin	Quartiles	Army Alpha	Terman	Scholarship	Practice Teaching
History (Con.)	12	6	5	7	10	10	11
	13	13	5	9	12	8	9
	14	13	12	11	8	10	8
	15	8.9	12	11	9	12	9
	16	11	12	8	9	11	10
	17	6	5	8	8	9	6
	18	13	9	11	7	10	6
	19	6	9	11	11	9	6
		9.9	9.7	9.2	9.3	10.5	9.6
Com.	1	13	9	14	14	9	9
Ed.	1	13	12	8	8	11	14
F. A.	1	15	12	15	9	11	13
		13.	11.3	12.3	10.3	10.3	12.

41 NON-GRADUATES

Pupil Number	Entrance Units of Latin	Quartiles	Army Alpha	Terman	Scholarship	Credits Earned
1	5.5	2	2	0	8	14
2	5.5	12.3	3	8	6	12
3	12.6	8.9	4	9	7	23
4	9	8.9	6	8	4	4
5	12.6	12.3	6	8	7	16
6	11	2	6	9	5	7
7	9	8.9	6	5	6	14
8	9	8.9	7	7	3	2
9	5.5	8.9	7	9	9	31
10	9	8.9	7	6	7	11
11	12.6	12.3	8	12	8	58
12	5.5	8.9	9	9	9	16
13	8.	2	8	10	7	15
14	5.5	5.5	9	7	4	3
15	5.5	8.9	9	9	4	3
16	12.6	2.	10	10	6	11
17	11.	2.	4	9	1	0
18	12.6	12.3	9	4	10	15
19	3.5	2	10	9	5	5
20	12.6	12.3	10	11	11	15
21	12.6	8.9	10	12	7	13

Pupil Number	Entrance Units of Latin	Quartiles	Army Alpha	Terman	Scholarship	Credits Earned
22	9.	8.9	10	11	6	32
23	9.	12.3	10	7	8	15
24	12.6	5.5	10	8	5	3
25	5.5	5.5	10	8	6	12
26	9.	5.5	11	11	7	27
27	12.6	12.3	11	11	1	0
28	9.	12.3	11	7	9	29
29	5.5	5.5	11	10	8	13
30	5.5	5.5	11	9	10	33
31	9	5.5	12	11	8	32
32	5.5	5.5	11	10	7	18
33	5.5	12.3	11	9	8	14
34	9.	8.9	13	14	6	16
35	12.6	5.5	13	12	9	52
36	12.6	8.9	13	14	6	17
37	12.6	8.9	13	8	10	16
38	2.6	8.9	13	11	7	5
39	9.	12.3	14	14	7	16
40	12.6	12.3	14	14	12	36
41	12.6	12.3	15	14	12	18
	9.4	8.1	9.4	9.3	7.	16.8

A = Practice Teaching C = Scholarship

PLATE I

CORRELATIONS OF CRITERION "A" WITH C, 1, 2, 3, 4, 5, 6

108 Students

	Sigma = $\sqrt{MA^2-(MA)^2}$
A	2.714
C	2.318
1	2.951
2	2.600
3	3.047
4	2.856
5	5.335
6	7.490
A–C	.431
1	−.002
2	.082
3	.0925
4	.1267
5	.1207
6	.1135
C–1	.1667
2	.382
3	.412
4	.396
5	.447
6	.517
1–2	.2746
3	.172
4	.068
5	.135
6	.5854
2–3	.182
4	.058
5	.135
6	.551

3–4	.6334
5	.9104
6	.779
4–5	.897
6	.686
5–6	.812
D–1	.152
2	.333
3	.091
4	.1636
5	.139
6	.277
1–2	.2966
3	.2098
4	.154
5	.200
6	.622
2–3	.1417
4	.087
5	.126
6	.571
3–4	.654
5	.911
6	.756
4–5	.9076
6	.7126
5–6	.808

PLATE II

CORRELATIONS OF CRITERION "B" WITH 1, 2, 3, 4, 5, 6

108 Students

	$\text{Sigma} = \sqrt{MA^2 - (MA)^2}$
B	4.262
B–1	.009
2	.260
3	.283
4	.296
5	.320
6	.353

B = Scholarship

PLATE III

CORRELATIONS OF CRITERION "C" WITH D, 1, 2, 3, 4, 5, 6

Formula used is:[1]

$$r_{xx} = \frac{M_{xxy} - M_x X M_y}{\sqrt{M_{x2} - (M_x)^2}\sqrt{M_{y2} - (M_y)^2}}$$

153 Students

	$\text{Sigma} = \sqrt{MA_2 - (MA)^2}$
C	2.986
D	22.575
1	2.968
2	2.973
3	3.027
4	2.970
5	5.453
6	7.955

[1]The notation on the work sheet, A corresponds to x and B corresponds to x in the formula. Strictly speaking the formula, to agree with the notation on the work sheet, should be:

$$r = \frac{M_{AxB} - M_A \times M_B}{\sqrt{M_{A2} - (M_A)^2}\ \sqrt{M_{B2} - (M_B)^2}}$$

In this formula the radicals in the denominator are really the standard deviation or sigmas.

$$\text{Thus, } \sqrt{M_{A2} - (M_A)^2} = \text{sigma}_A$$

153 Students	
C–D	.655
1	.2256
2	.478
3	.353
4	.342
5	.382
6	.525

D = Persistence in School.

PARTIAL CORRELATIONS

$r_{C2.1} = +.4416$	$r_{24.C} = -.095$*	
$r_{C3.1} = +.321$	$r_{C3.21} = +.3167$	
$r_{C4.1} = +.319$	$r_{C4.21} = +.334$	$r_{C4.321} = +.1788$
$r_{23.1} = +.0851$		
$r_{24.1} = +.0438$	$r_{34.21} = +.6429$	
$r_{34.1} = +.6436$		($r_{C3.421} = +.1409$)
$2_{C4.2} = +.343$*		
$r_{C3.4} = +.182$		
$r_{C2.4} = +.4784$	$r_{C2.34} = +.4688$	($r_{C2.134} = +.4467$)
$r_{C1.4} = +.1861$	$r_{C1.34} = +.164$	
$r_{C.24} = +.478$		
$r_{32.4} = +.1126$		
$r_{31.4} = +.1461$	$r_{31.24} = +.1194$	
$r_{21.4} = +.2877$	$r_{21.34} = +.2758$	$r_{C1.234} = +.0409$

Sigma C = 3 Scholarship*
Sigma 2 = .882 Quartiles*
Sigma 4 = 21.35 Terman*

PARTIAL CORRELATIONS

$r_{A2.1} = .086$

$r_{A3.1} = .094$ $r_{A3.12} = +.083$

$r_{A4.1} = .127$ $r_{A4.12} = +.124$ $r_{A4.123} = +.093$

$r_{23.1} = .142$

$r_{24.1} = .041$

$r_{34.1} = .632$ $r_{34.12} = +.633$

$(r_{A3.124} = +.006)$

$r_{A3.4} = +.0159$ $(r_{A2.134} = +.079)$

$r_{A2.4} = .075$ $r_{A2.34} = +.073$

$r_{A1.4} = -.0107$ $r_{A1.34} = -.0136$ $r_{A1.234} = -.0328$

$r_{32.4} = +.188$ $r_{31.24} = +.1226$

$r_{31.4} = +.167$

$r_{12.4} = +.272$ $r_{12.34} = +.248$

CRITERION **C** WITH 1, 2, 3, 4

$M_C = 10.013$ $S.D._C = 2.986$

$M_1 = 10.399$ $S.D._1 = 2.968$

$M_2 = 9.765$ $S.D._2 = 2.973$

$M_3 = 10.007$ $S.D._3 = 3.027$

$M_4 = 10.111$ $S.D._4 = 2.970$

R's

$r_{C1} = +.2256$

$r_{C2} = +.478$ $r_{12} = +.2966$ $r_{23} = +.1417$

$r_{C3} = +.353$ $r_{13} = +.2098$ $r_{24} = +.087$ $r_{34} = +.654$

$r_{C4} = +.342$ $r_{14} = +.154$

MULTIPLE CORRELATION

$R_{A(1234)} = .151$

REGRESSION EQUATION FOR PRACTICE TEACHING

$X_A = -.031X_1 + .086X_2 + .007X_3 + .114X_4 + 8.25$

CRITERION A WITH 1, 2, 3, 4

$M_A = 10.074$	$S.D._A = 2.714$				
$M_1 = 10.648$	$S.D._1 = 2.951$	$r_{A1} = -.002$			
$M_2 = 10.324$	$S.D._2 = 2.600$	$r_{A2} = +.082$	$r_{12} = +.2746$	$r_{23} = +.182$	
$M_3 = 10.222$	$S.D._3 = 3.047$	$r_{A3} = +.0925$	$r_{13} = +.172$	$r_{24} = +.058$	$r_{34} = +.6334$
$M_4 = 10.500$	$S.D._4 = 2.856$	$r_{A4} = +.1267$	$r_{14} = +.068$		

A = Criterion, Practice Teaching.
C = Criterion, Scholarship.
D = Persistence in School.
1 = Entrance Units of Latin.
2 = Quartiles in High School.
3 = Army Alpha.
4 = Terman.
5 = Combination of Army Alpha and Terman.
6 = Sum of four factors.

MULTIPLE CORRELATION

$$R_{C(1234)} = .577$$

REGRESSION EQUATION FOR SCHOLARSHIP*

$$X_C = +.036X_1 + .43X_2 + .153X_3 + .197X_4 + 1.923$$

*Regression Equation for Scholarship and two factors, Quartiles and Terman is:

$$S = 1.53Q + .0425T - 2.61$$

LETTER TO THOSE WHO HAVE BEEN TEACHING FOR ONE TO TWO YEARS

University of Pennsylvania
Philadelphia

THE SCHOOL OF EDUCATION
OFFICE OF THE DEAN

January 3, 1928.

My dear :

In order to get information for an investigation that we are making, the School of Education is sending out the following questionnaire. Will you please answer the questions and enclose in the self-addressed stamped envelope as quickly as possible? Your name will not appear in the investigation.

1. Are you teaching school at the present time?.....
2. Where are you teaching?.....
3. Name of your superintendent or principal? .....
   .....
4. If you are not teaching school at the present time, but have taught since graduation give name of superintendent and place where you last taught.
   .....
   .....

Thanking you very kindly for a prompt reply, I am

Sincerely yours,
DEAN, *School of Education.*

LETTER TO SUPERINTENDENTS ASKING THEM TO RANK TEACHERS

University of Pennsylvania
Philadelphia

THE SCHOOL OF EDUCATION
OFFICE OF THE DEAN

February 6, 1928

DEAR :

In order to get information for an investigation we are making in the School of Education, we are asking you to rank .....on a scale allowing "D" to represent the best teacher in your system and "P" the poorest. Please circle the letter that best ranks the above teacher D, D—, G+, G, G—, P+, P.

Your name or that of the teacher will not be used in this investigation.

Thanking you very kindly, I am

Sincerely yours,

LETTER TO THE 108 GRADUATES OF THE SCHOOL OF EDUCATION

Dear .....:

In order to get information for an investigation, the Department of Education is asking for the following facts. Will you please answer the questions and mail in the enclosed envelope as quickly as possible? The information will be considered confidential.

If you are teaching or substituting answer these questions.

1. Name of School .....
2. Name of Place .....
3. Name of Principal or Superintendent .....
4. Name and grade of subjects you are teaching.

1.....2.....3.....4.....

5. How many classes per day do you teach in each subject?

   .....

6. Name the extra-curricular activities for which you are responsible as sponsor.

   1.....2.....3.....4.....

7. Name the professional courses that have been the most practical benefit to you.

   1.....2.....3.....4.....

   Why do you think the courses named above have been beneficial to you? .....

   .....

   What state certificate do you hold?.....

If you are not teaching or substituting answer these questions.

1. In what work are you now engaged? .....
2. In what specific ways, if at all, has the School of Education been of benefit to you in your present work?

   .....

   .....

   Check the following reasons why you did not enter the teaching profession:

	Yes	No
1. Preferred other work		
2. Could not get a position		
3. Could not get position desired		
4. Location of obtainable position undesirable		
5. Other reasons beyond your control.		
6. Salary not sufficient		

Your co-operation in an immediate reply will be greatly appreciated.

Sincerely,

LETTER AND QUESTIONNAIRE TO DROP OUTS

University of Pennsylvania
Philadelphia

THE SCHOOL OF EDUCATION
OFFICE OF THE DEAN

January 21, 1928.

Dear

An effort is being made by a study now in progress in the Department of Education of the University of Pennsylvania to determine why those admitted to the School of Education failed to graduate and in many cases dropped out at the end of the first year.

Will you please do us the favor of writing on the back of this letter the reasons why you left the School of Education, or fill out the enclosed blank, or both, as you prefer? The value of the study is dependent on your cooperation in stating your reasons for dropping out, or answering the questions truthfully and completely.

Be assured that your name will not be used in this study.

Find enclosed stamped addressed envelope. An early reply will be appreciated.

Sincerely yours,

Check thus √ under *yes* or *no* at the end of each statement as to whether that item was a cause for your dropping out of School of Education. Every item should be checked under *yes* or *no*.

	Yes	No
1. General poor health		
2. Illness in your home and family		
3. Death in the family		
4. Economic and financial reverses in the family		
5. Family was not in sympathy with your continuance in School of Education		
6. Family wished you to continue in School of Education		

7. Spent too much time in outside work to defray college expenses .....
8. Had to borrow too heavily; did not wish to go in debt so much .....
9. Decided to get married and stopped school for that purpose .....
10. Too much time to social engagements (not connected with University) caused you to neglect school work .....
11. Too much time given to clubs, fraternities, athletics and organizations on the campus; i. e. extra curricular activities .....
12. Subjects and courses too difficult .....
13. Lack of interest in your work; did not care for subjects and courses pursued .....
14. Did not understand how to study and how to organize your work and time most efficiently..
15. Dropped out on account of poor marks.....
16. Had difficulty of a disciplinary nature with one or more of your instructors .....
17. Difficulty in establishing a friendly cooperative attitude with some or all of your instructors .....
18. Did not get to join the social group you preferred and dropped out for that reason.....
19. Not happy in your social relations with students and classmates .....
20. Did not like the spirit of the school and the general atmosphere of the place .....
21. Did not wish to become a teacher and consequently saw no reason for continuing your work .....
22. Had no real reason other than you just wished to drop out .....
23. Could not see any value in remaining in school

24. You wished to transfer to another college, school or university. .....
25. You wished to transfer to another department of this University .....
26. Please list all the organizations, clubs, societies, athletic, social or academic, to which you belonged while in college

    (1)..... (2)..... (3).....

    (4)..... (5)..... (6).....

    (7)..... (8)..... (9).....
27. List the subjects that were difficult for you.

    (1)..... (2)..... (3).....
28. List the subjects that were easy for you.

    (1)..... (2)..... (3).....
29. If you did outside work to defray a part of your expenses, please give the approximate number of hours spent daily, and nature of the work .....

    .....

    .....
30. After you have checked all items *yes* or *no* go back and make a circle after the items that are most important as causes for dropping out.

IF INSUFFICIENT SPACE IS PROVIDED FOR ANSWERING ANY ITEM PLEASE WRITE ON THE REVERSE SIDE OF THIS SHEET AND NUMBER THE ANSWER TO CORRESPOND WITH THE ITEM.

FOLLOW-UP LETTER TO DROP-OUTS

University of Pennsylvania
Philadelphia

THE SCHOOL OF EDUCATION
OFFICE OF THE DEAN

February 8, 1928.

Dear

Several answers to letters sent to those who dropped out of the School of Education have not yet arrived. It is important that we get this information.

If you have *not sent* in an answer to the first letter and questionnaire, will you please write on the back of this letter the reason or reasons why you dropped out of the School of Education, and mail at once in the self-addressed stamped envelope.

Your name will not appear in any way.

Sincerely yours,
DEAN, *School of Education.*